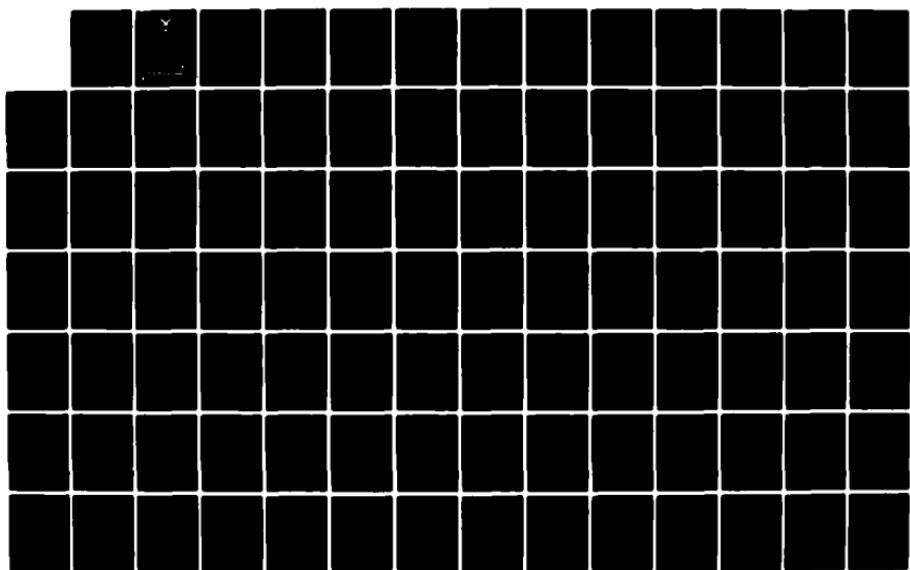
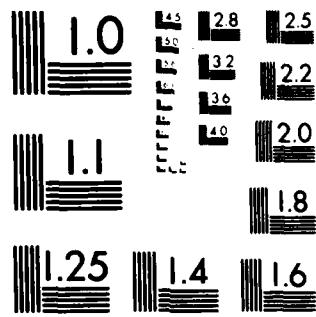


AD-A135 599

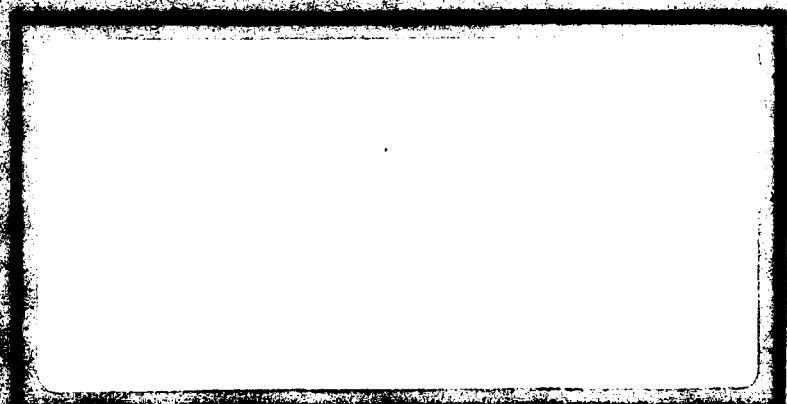
A QUALITATIVE ANALYSIS OF SUPERVISION IN SAC MINUTEMAN 1/2
ICBM MAINTENANCE(U) AIR FORCE INST OF TECH
WRIGHT-PATTERSON AFB OH SCHOOL OF SYSTEMS AND LOGISTICS
S W FANCHER SEP 83 AFIT-LSSR-112-83 F/G 5/9 NL

UNCLASSIFIED





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963 A



DTIC
SELECTED
081983



A

A QUALITATIVE ANALYSIS OF
SUPERVISION IN SAC MINUTEMAN
ICBM MAINTENANCE

Samuel W. Fancher, Captain, USAF

LSSR 112-83

A1

The contents of the document are technically accurate, and no sensitive items, detrimental ideas, or deleterious information are contained therein. Furthermore, the views expressed in the document are those of the author(s) and do not necessarily reflect the views of the School of Systems and Logistics, the Air University, the Air Training Command, the United States Air Force, or the Department of Defense.

Approved for release
[Signature]



UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER LSSR 112-83	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) A QUALITATIVE ANALYSIS OF SUPERVISION IN SAC MINUTEMAN ICBM MAINTENANCE		5. TYPE OF REPORT & PERIOD COVERED Master's Thesis
7. AUTHOR(s) Samuel W. Fancher, Captain, USAF		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS School of Systems and Logistics Air Force Institute of Technology, WPAFB OH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Department of Communication AFIT/LSH, WPAFB OH 45433		12. REPORT DATE September 1983
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		13. NUMBER OF PAGES 99
16. DISTRIBUTION STATEMENT (of this Report)		15. SECURITY CLASS. (of this report) UNCLASSIFIED
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE 15 SEP 1983
18. SUPPLEMENTARY NOTES <i>Approved for public release: IAW AFR 180-17.</i> <i>John E. WOLVER</i> <i>Dean for Research and Professional Development</i> <i>Air Force Institute of Technology (ATC)</i> <i>Wright-Patterson AFB OH 45433</i>		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Supervision Minuteman Missile Maintenance Supervisory Style Micromanagement		Motivation Job Satisfaction
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Thesis Chairman: Jerome G. Peppers, Jr., GM-15		

DD FORM 1473, JAN 73 EDITION OF 1 NOV 68 IS OBSOLETE

UNCLASSIFIED

~~SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)~~

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

Supervision is a large part of managing the SAC Minuteman ICBM maintenance production effort by providing important factors which lead to job satisfaction and motivation in subordinates. The people who manage, supervise, and perform missile maintenance are uniquely qualified to identify problems in the missile maintenance work environment. A qualitative survey shows that micromanagement, failing to provide challenging and meaningful work, and high work pressure are the three most prevalent problems in missile maintenance supervision. Other problems identified include low officer competence, lack of positive feedback, and NCO supervisory style.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

LSSR 112-83

A QUALITATIVE ANALYSIS OF SUPERVISION IN
SAC MINUTEMAN ICBM MAINTENANCE

A Thesis

Presented to the Faculty of the School of Systems and Logistics
of the Air Force Institute of Technology
Air University

In Partial Fulfillment of the Requirements for the
Degree of Master of Science in Logistics Management

By

Samuel W. Fancher, BA
Captain, USAF

September 1983

Approved for public release;
distribution unlimited

This thesis, written by

Samuel W. Fancher

has been accepted by the undersigned on behalf of the
faculty of the School of Systems and Logistics in partial
fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN LOGISTICS MANAGEMENT

DATE: 28 September 1983



A handwritten signature in black ink, appearing to read "Samuel W. Fancher". Below the signature, the text "COMMITTEE CHAIRMAN" is printed in a smaller, sans-serif font.

ACKNOWLEDGEMENTS

I would like to thank Mr. Jerome G. Peppers, my thesis advisor, for the gentle KITA's to get me through this project; and Wendy Campbell of the AFHRL, who gave me the data and then trusted me not to write anything bad about the parent project. I also wish to thank Phyllis Reynolds who made putting this monster together for final copy seem easy.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	iii
LIST OF TABLES	vii
LIST OF FIGURES	viii
CHAPTER	
I. INTRODUCTION	1
Overview	1
Air Force Maintenance Concept and Policy	3
Minuteman ICBM Maintenance Structure and Policy	6
The Deputy Commander for Maintenance	8
The Maintenance Staff	8
The Missile Management Squadrons	13
Field Missile Maintenance Squadron	16
Organizational Missile Maintenance Squadron	17
Justification	19
Scope	23
Problem Statement	24
Research Objectives	25
II. LITERATURE REVIEW	26
Introduction	26
Supervision and Motivation	26

CHAPTER	Page
Supervision and Job Satisfaction	32
Conclusion	38
III. METHODOLOGY	39
Introduction	39
AFHRL Procedures	42
Planning and Pretests	42
Data Collection	44
Sampling	49
Data Analysis Methodology	49
IV. RESULTS	56
Introduction	56
Relative Frequencies	56
Test for Similarity	64
Descriptive Summaries	66
Supervisor Competence	66
Officer Competence	67
Officer Training	67
Management/PME Training	68
Respect for Supervisors/Role Models . . .	68
Desire To Do Responsible Meaningful Work .	69
Desire To Do a Complete Job/Desire About Doing the Job	69
Feedback	69
Job-Task Satisfaction	70
Supervisory Style	71

CHAPTER	Page
Discipline	74
Work Pressure	74
V. SUMMARY AND CONCLUSIONS	76
Introduction	76
Summary of the Results	76
Conclusions	80
Recommendations	83
BIBLIOGRAPHY.	84
REFERENCES CITED	85

LIST OF TABLES

LIST OF FIGURES

Figure	Page
1-1 Minuteman Wing Maintenance Organization	9
1-2 Supervisory Hierarchy, Squadron Level	15
1-3 Field Missile Maintenance Squadron	18
1-4 Organizational Missile Maintenance Squadron . .	20
2-1 Hackman and Oldham's Job Characteristics Model .	29
2-2 Hall's Model of Psychological Success	31
3-1 Technician Needs Prompting Device	43
3-2 Statement Categorization Scheme--Phase III . . .	45
3-3 Privacy Act Statement	46
3-4 Interview Procedures	47
3-5 Biographical Data Form	48
3-6 Example of Transcription and Coding Forms . . .	50
3-7 Categories Chosen for Analysis	53
4-1 Relative Frequencies, Base A	59
4-2 Relative Frequencies, Base B	60
4-3 Relative Frequencies, Base C	61
4-4 Relative Frequencies, Overall	62

CHAPTER I

INTRODUCTION

Overview

The mission of the Air Force includes deterrence of nuclear war through participation in the U.S. strategic triad. The triad consists of manned bombers, submarine-launched ballistic missiles, and land-based intercontinental ballistic missiles. Through these weapon systems the triad provides deterrence to aggression. Since the technology of our potential enemies eliminates any period of grace, these systems must be in a constant state of readiness. This degree of readiness relates directly to the ability of the maintenance organization to provide weapon systems that are "serviceable, safely operable, and properly configured to mission needs [34:1]." The missile maintenance units which supply these requirements are large, complex organizations "that require management to plan, organize, assemble resources, motivate, and control [34:1-3]." Maintenance managers and supervisors in a Strategic Air Command (SAC) missile maintenance organization play key roles in ensuring effective maintenance. This study is concerned with identifying missile maintenance supervision problems

so that missile maintenance units in SAC can better manage and supervise their activities and personnel.

Each SAC missile maintenance organization has some form of problem identification process. Many times, however, problem identification relates only to technical subjects concerning equipment or procedures. Problems with management, attitudes, supervisory styles, and morale are not as often identified. Little has been done in the way of exploratory studies to identify where problems lie in missile maintenance supervision. A holistic view to identifying problems in maintenance supervision can be valuable in providing an understanding of where the most severe problems are and which ones have the greatest possibility of success in being solved.

In this study there are two underlying assumptions. First, the people who plan, manage, supervise, and perform maintenance are the people who know best what the problems are. This assumption is closely related to a primary concept of quality circles, a management technique used to identify and solve problems. Second, in studying SAC missile maintenance supervision as a whole, specific problems will be exposed that can give SAC supervisors and leaders new perspectives from which to solve these problems.

Air Force Maintenance Concept
and Policy

The Air Force has established prescribed maintenance organizations and has assigned them responsibilities to contribute to the Air Force mission. Air Force Regulation (AFR) 66-1 states:

Maintenance, as a functional element of the organization, is responsible for ensuring that Air Force material is serviceable, safely operable, and properly configured to meet the mission needs [34:1].

The importance of maintenance to the Air Force and to SAC is paramount. AFR 66-1 points out that "the degree of equipment readiness which exists in an operating level organization must be directly related to the mission [24:1-2]." Since the Single Integrated Operations Plan (SIOP) requires a high alert rate for ICBMs, missile maintenance is tasked with constantly providing quality maintenance (31:Vol.1,p.1-1).

The missile maintenance complex provides maintenance production and data inputs for maintenance engineering decisions (33:2). The production element of maintenance, or maintenance production, concerns the actual work performed on equipment. Maintenance production is broken into two categories: on-equipment maintenance and off-equipment maintenance. On-equipment work is done on a specific, complete end-item such as an ICBM. This type of maintenance takes place generally at the launch facility (LF) or at the launch control facility (LCF) by a team

dispatched from the support base. Off-equipment maintenance is work performed on components which have been removed from the weapon system entity. This type of maintenance is performed in shops and laboratories at the support base or at depot level (33:1-4). Both types of maintenance production may involve functions such as removal and replacement, repair, inspection, servicing, calibration, adjustment, or lubrication of weapon system components (33:1-4).

Maintenance engineering is the technical element of the maintenance function. Through the basic inputs from the maintenance organization, Air Force technical agencies determine maintenance requirements and procedures compatible with maintenance concepts and equipment design. For example, a technical order with procedures for periodic inspection and replacement of a component based on reliability data for that component would be an output of maintenance engineering (33:1-4).

Maintenance production is the primary function of the wing level organization. A major objective of this production element is equipment maintenance. The main goal of equipment maintenance is to keep weapon systems and weapon system equipment ready to perform the mission at the least cost (33:2). AFR 66-14 outlines the objectives of Air Force equipment maintenance:

1. Establish and sustain a maintenance capability to carry out Air Force operations at all times.

2. Insure that Air Force maintenance organizations are designed, or are quickly adaptable, to support the wartime mission and that they can meet all operational needs.

3. Insure that all Air Force materiel is serviceable, operable, and configured to meet the mission.

4. Insure that maintenance planning starts in the conceptual phase of the acquisition process for each new system or equipment, and remains current throughout the life of the equipment (33:2).

In order to meet these objectives, that is, to maintain a maintenance capability, AFR 66-1 provides some guidelines:

1. Plans and schedules must be set up to make sure individuals are properly employed throughout the workshift.

2. Skill levels should be distributed throughout the maintenance organization and on workshifts to insure the best supervision, training, and mission support.

3. Additional resources should be requested and justified to insure continuous workloads or to help perform emergency workloads. When resources cannot be made available, reduced mission requirements may be necessary (34:1-2).

Minuteman ICBM Maintenance Structure
and Policy

All major commands are required to implement Air Force maintenance policies in managing maintenance resources.

Strategic Air Command Regulation (SACR) 66-12, Volume I, outlines Air Force maintenance policy in terms of ICBM maintenance requirements:

All maintenance actions and all of management's efforts must be dedicated to support of the Single Integrated Operations Plan (SIOP). A high alert rate is required; however, it must be the product of effective and safe management of assets without compromise of safety, security, or maintenance discipline [31: Vol.I,p.1-1].

The elements of this policy include weapon system, safety, workload, people, and management requirements.

1. An optimum number of ICBMs must be maintained on strategic alert (31:Vol.I,p.1-1).

2. Safety is critical to all maintenance activities in ICBM maintenance. ICBM maintenance is unique in that most maintenance is performed at launch facilities (LFs) or launch control facilities (LCFs) which are considerable distances from the support base. Nuclear, missile, explosive, and ground safety requirements are necessary since the work environment contains all three types of potential hazards (31:Vol.I,p.1-2).

3. Workload requirements include supervision, economy of resource utilization, repeat maintenance actions,

workload reporting procedures, and scheduling (31:Vol.I, p.1-3).

4. SACR 66-12, Volume I, states that people are a manager's most valuable asset, and that managers and supervisors must insure that their people are equipped, trained, and motivated to perform effective, quality maintenance (31:Vol.I,p.1-4).

5. Management is responsible for security protection, maintenance management systems, management training programs, management effectiveness programs, and management of SAC ICBM Critical Items (31:Vol.I,p.1-5).

A typical Minuteman wing has three or four operations squadrons of fifty missiles each. Each missile is controlled by a Launch Control Facility (LCF) which controls ten missiles. The missiles are dispersed in Launch Facilities (LF) five to eight miles apart, and are located anywhere from thirty to over one hundred miles away from the support base. The Minuteman maintenance unit in an ICBM wing follows a concept which uses decentralized specialists and strong centralized control. Maintenance in an ICBM unit utilizes the team, or maintenance crew concept. The Wing Commander is ultimately responsible for the operation of the wing, which includes the maintenance complex. Under the tri-deputate system (Operations, Maintenance, and Resources), the Deputy Commander for Maintenance is the manager responsible to the Wing Commander for providing

effective maintenance at the base level (21:p.1-2).

Figure 1-1 shows the organizational structure of the wing maintenance complex.

The Deputy Commander for Maintenance

Within the maintenance unit, the Deputy Commander for Maintenance (DCM) manages the entire maintenance complex. He or she is required to plan, schedule, control, and direct all maintenance resource utilization to meet mission needs. The DCM is responsible for all weapon system maintenance performed at LFs, LCFs, and at the support base by personnel assigned to maintenance staff and production agencies.

The Maintenance Staff

Through the maintenance staff agencies and maintenance production agencies, the DCM fulfills his basic responsibilities, which include: general management, safety and security, Emergency War Order (EWO) management, missile alert status management, workload management, people and organization management, quality assurance, training, and other functions (31:Vol.I,pp.2-1 to 2-3).

The DCM has an enlisted maintenance superintendent assigned to assist him or her in carrying out the basic responsibilities listed above. The maintenance superintendent serves as the primary observer of the daily

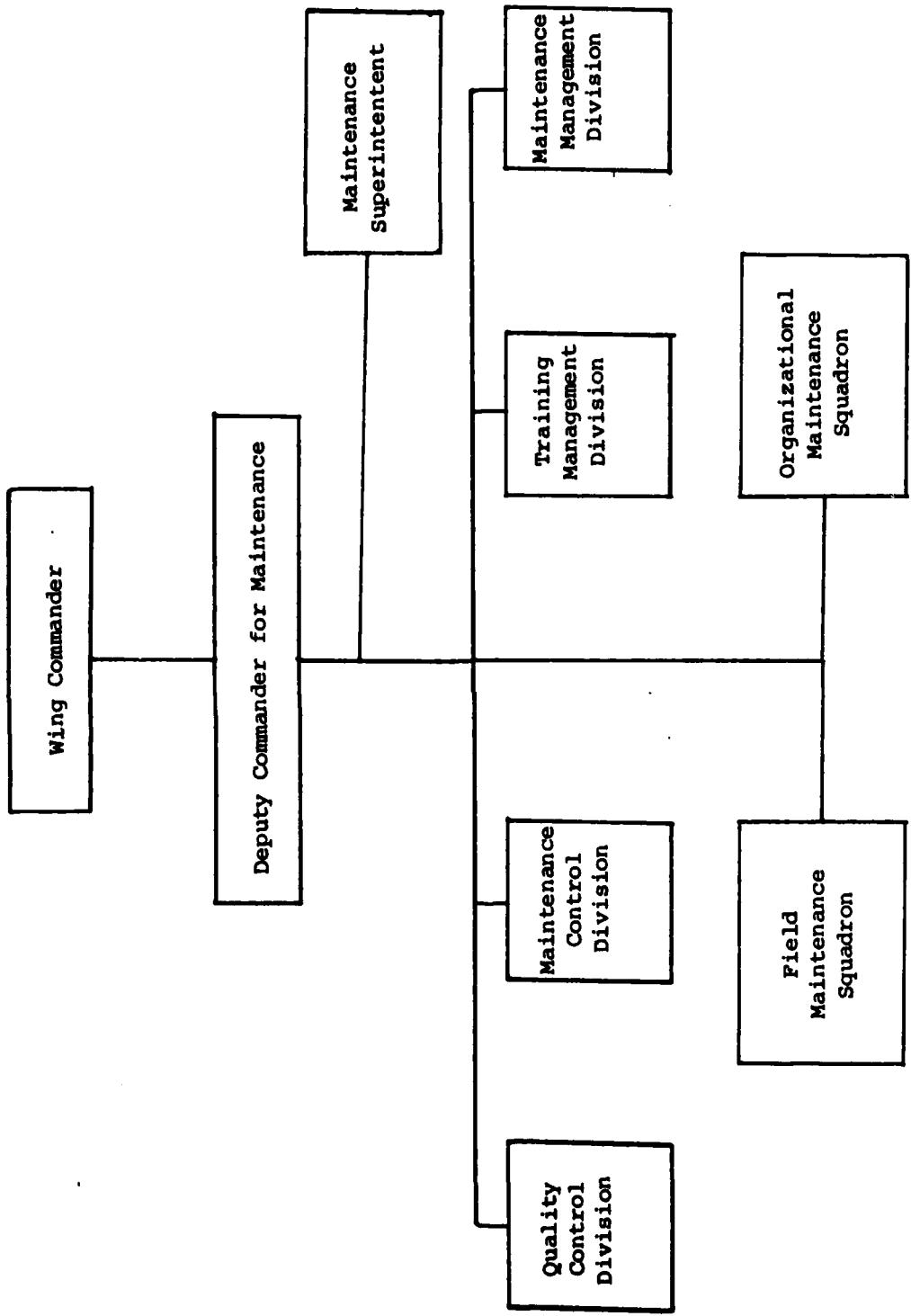


Fig. 1-1. Minuteman Wing Maintenance Organization

maintenance production effort, and provides feedback to the DCM. The maintenance superintendent is also a link between the enlisted force and DCM (31:Vol.I.p.2-4).

The wide range of responsibilities of the DCM makes it necessary for him or her to have a staff appointed, with the requisite agencies, to provide specialists, help prepare plans, make recommendations, and make sure that quality maintenance is performed. In a Minuteman ICBM unit, the DCM staff agencies are Training Control Division, Maintenance Support Division, Maintenance Control Division, and Quality Control Division.

The Training Control Division schedules, monitors, and controls all training for the entire maintenance complex including upgrade training, job qualification training, management training, general training, special technical training, and recurring technical training (31:Vol.IV, pp.1-1 to 1-4). Training control is made up of two branches: Training Management Branch (TMB), and Team Training Branch (TTB). TMB is responsible for monitoring, scheduling, and controlling upgrade, job qualification, management, general, recurring, and special technical training programs. The objective of TMB is to train the individual technicians. TTB is responsible for training the Missile Maintenance Teams (MMTs), Electro-Mechanical Teams (EMTs), Facility Maintenance Teams (FMTs), and Periodic Maintenance Teams (PMTs) which are assigned to the missile maintenance

squadrons. The objective of TTB is to train technicians to perform as effective, coordinated teams (31:Vol.IV,pp.3-1 to 4-1).

The Maintenance Support Division provides support to other DCM staff agencies, including:

1. Administrative management for reports, correspondence, standard publications, and technical orders (T.O.s) through the Maintenance Administration Branch;
2. Management of all data automation and maintenance documentation through the Maintenance Data Branch;
3. Manpower, financial, facilities, mission support equipment, missile support plans, and long-range plans management through Maintenance Programs Branch;
4. Production and deficiency analysis through Maintenance Analysis Branch;
5. Technical expertise to solve problems beyond normal technical data resources through the Technical Engineering Branch (31:Vol.II,p.1-1).

The Maintenance Control Division is charged with providing centralized control of the decentralized specialists and teams which perform the production effort. Maintenance control has three branches to accomplish this function: Scheduling Control, Job Control, and Materiel Control. Scheduling Control performs intermediate and short-range workload planning by assigning resources to maintenance requirements, which are reported by Maintenance

Support Division, technicians, and field supervisors. Job Control directs and controls all missile maintenance tasks and dispatches specialists to jobs. Job Control implements the daily schedule and other requirements not included in the daily maintenance plan. As a directing and controlling agency, Job Control, together with Scheduling Control, becomes a supervisory entity. Materiel Control provides coordination between maintenance and supply, and manages acquisition requests for the maintenance complex (31:Vol.III,pp.1-1 to 1-4).

The Quality Control Division ensures effective maintenance operations through inspections and evaluations of personnel, equipment, procedures, facilities, and technical data. In addition, Quality Control advises the DCM on matters of a technical and procedural nature and insures that technical and procedural standards are adhered to. Quality Control implements the SAC Maintenance Standardization and Evaluation Program (MSEP) to achieve a high standard of quality maintenance through technical competence, technical procedures, and compliance with technical publications and maintenance directives. Quality Control does this by technician evaluations, technical inspections, activity inspections, and special one-time or unusual situation inspections (20:pp.1-8 to 1-9).

The Missile Maintenance Squadrons

The missile maintenance squadrons are the units within the maintenance complex which have the primary function of maintenance production through on- and off-equipment maintenance. The squadron commanders are tasked with ensuring adequate production capability within the squadrons to meet the mission needs. The Squadron Commander has several responsibilities within this primary function:

1. To organize resources and provide direction, mission orientation, and guidance for effective squadron operations;

2. Insure safety and security of assigned equipment;

3. Provide for the health, welfare, and morale of personnel;

4. Administer discipline and military justice; and

5. Administer the Personnel Reliability Program (31:Vol.VI,p.1-1).

While some of these responsibilities are delegated to other persons within the unit, the Squadron Commander is still ultimately accountable for them.

Assigned to the Squadron Commander is the squadron first sergeant. The job of the first sergeant is to promote the morale and welfare of the enlisted personnel,

assist in maintaining military discipline, and supervise the maintenance of squadron facilities. The first sergeant provides an informal link between the squadron enlisted personnel and the Commander (31:Vol.VI,p.1-2). The first sergeant can also be a great help to young supervisors in solving or preventing morale and discipline problems (21:1-20).

The maintenance supervisor in a missile maintenance squadron is responsible to the Squadron Commander for technical supervision and maintenance production of the entire squadron. Each branch in the squadron reports to him or her. The maintenance supervisor needs to understand the mission, production requirements, management concepts, and the lateral functions of other agencies and activities required for the maintenance effort (31:Vol.VI,p.1-3). To accomplish these responsibilities, the maintenance supervisor needs to know what happens in each function of the squadron. As a result, the officers and noncommissioned officers (NCOs) who work in the field as supervisors provide a feedback link to the maintenance supervisor. They also serve to act to implement the maintenance supervisor's policies (21:1-21). Figure 1-2 shows the hierarchy of supervision in a missile maintenance squadron.

Branch Chiefs are responsible to the maintenance supervisor for management of specific functional areas in the squadron. These specific functional areas are broken

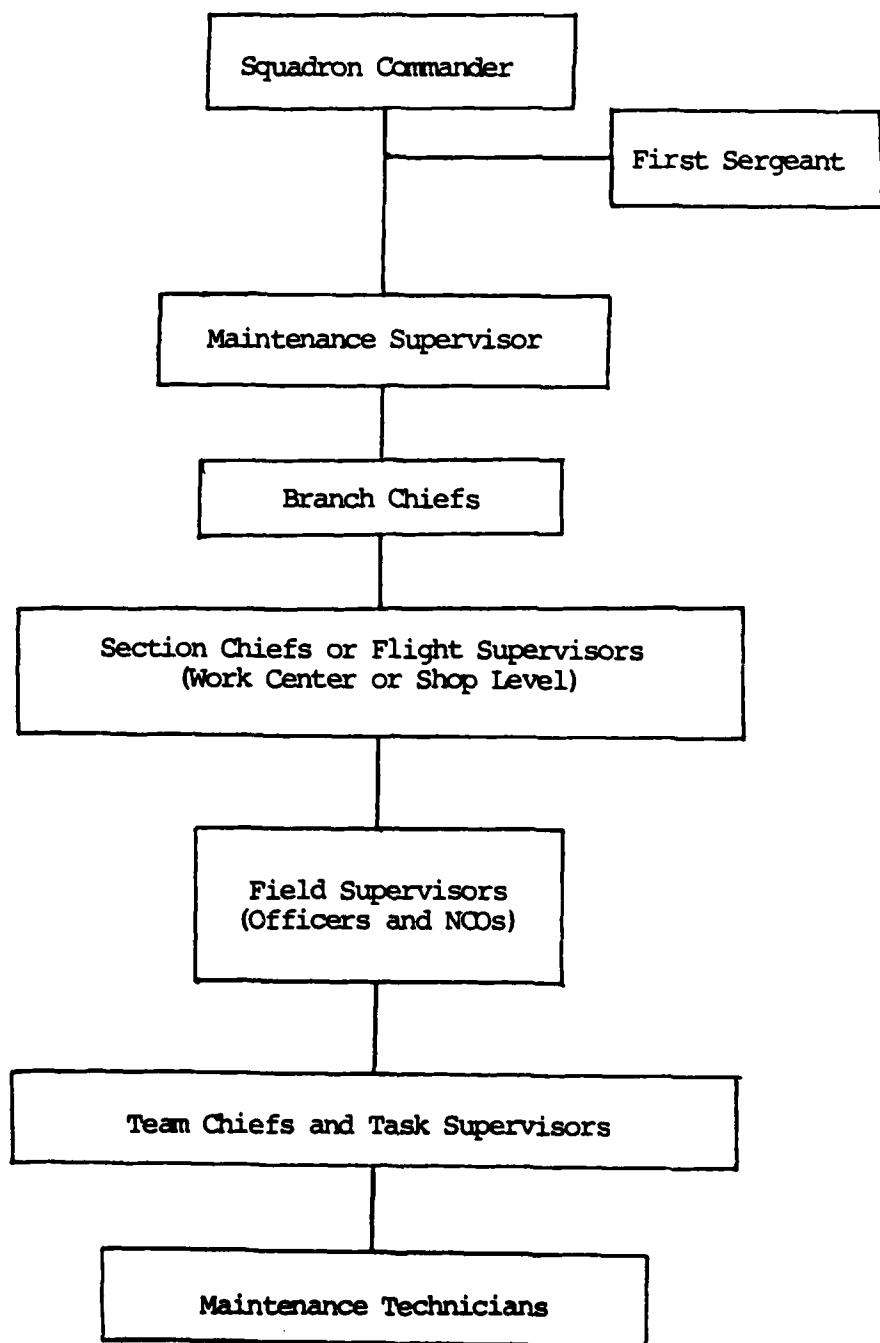


Fig. 1-2. Supervisory Hierarchy, Squadron Level

down into production-oriented work centers which take the form of shops or team sections (31:Vol.VI.p.1-4).

Section chiefs are responsible to their respective branch chiefs for management, supervision, and training of assigned maintenance technicians. Section chiefs are primarily concerned with maintenance production scheduled by maintenance control. Maintenance officers and NCOs are assigned to sections or work centers to supervise people and maintenance production operations in the field. As such, their main duty as field supervisors is to monitor and supervise maintenance activities at the missile sites.

Team chiefs are responsible for the actual maintenance production work performed in the shops or in the field. The team chief is responsible for the work done by his or her team. The technicians are responsible for designated task performance to the team chief (31:Vol.VI. pp.1-5 to 1-11).

Field Missile Maintenance Squadron. The Field Missile Maintenance Squadron is responsible for inspection, calibration, repair, adjustment, modification, and replacement of components of support equipment. It is made up of the Shop Maintenance, Facility Maintenance, and Vehicle and Equipment Control Branches. When authorized, a Precision Measurement Equipment Laboratory and Reentry Vehicle Branch may be assigned.

The Shop Maintenance Branch consists of the Mechanical Shop, Power-Refrigeration-Electric Shop, and the Electronics Laboratory. A Powered Aerospace Ground Equipment Shop may be assigned. The Facility Maintenance Branch contains the Facility Maintenance Team (FMT) Section, the Pneudraulics Section, the Corrosion Control Section, and the Periodic Maintenance Team (PMT) Section. The PMEL Branch, when assigned, maintains, calibrates, and certifies certain specified test equipment. The Vehicle and Equipment Control Branch (VECB) ensures serviceable vehicles and equipment are available to the maintenance teams for maintenance at the LFs or LCFs, including special tools, special-purpose vehicles, and other maintenance support equipment. The Reentry Vehicle Branch, when assigned, is responsible for maintenance on reentry vehicle warheads and related handling and test equipment. Figure 1-3 shows the organizational chart for the FMMS (30:Vol.VI.pp.3-1 to 3-4).

Organizational Missile Maintenance Squadron. The Organizational Missile Maintenance Squadron (OMMS) provides maintenance teams for missile maintenance support. OMMS teams perform on-equipment maintenance on selected end-items at LCFs, LFs, and on selected vehicles, support equipment, and (when assigned) transient aircraft. The squadron has a Missile Mechanical Branch, a Missile Electrical Branch, and, when assigned, a Transient Alert Branch.

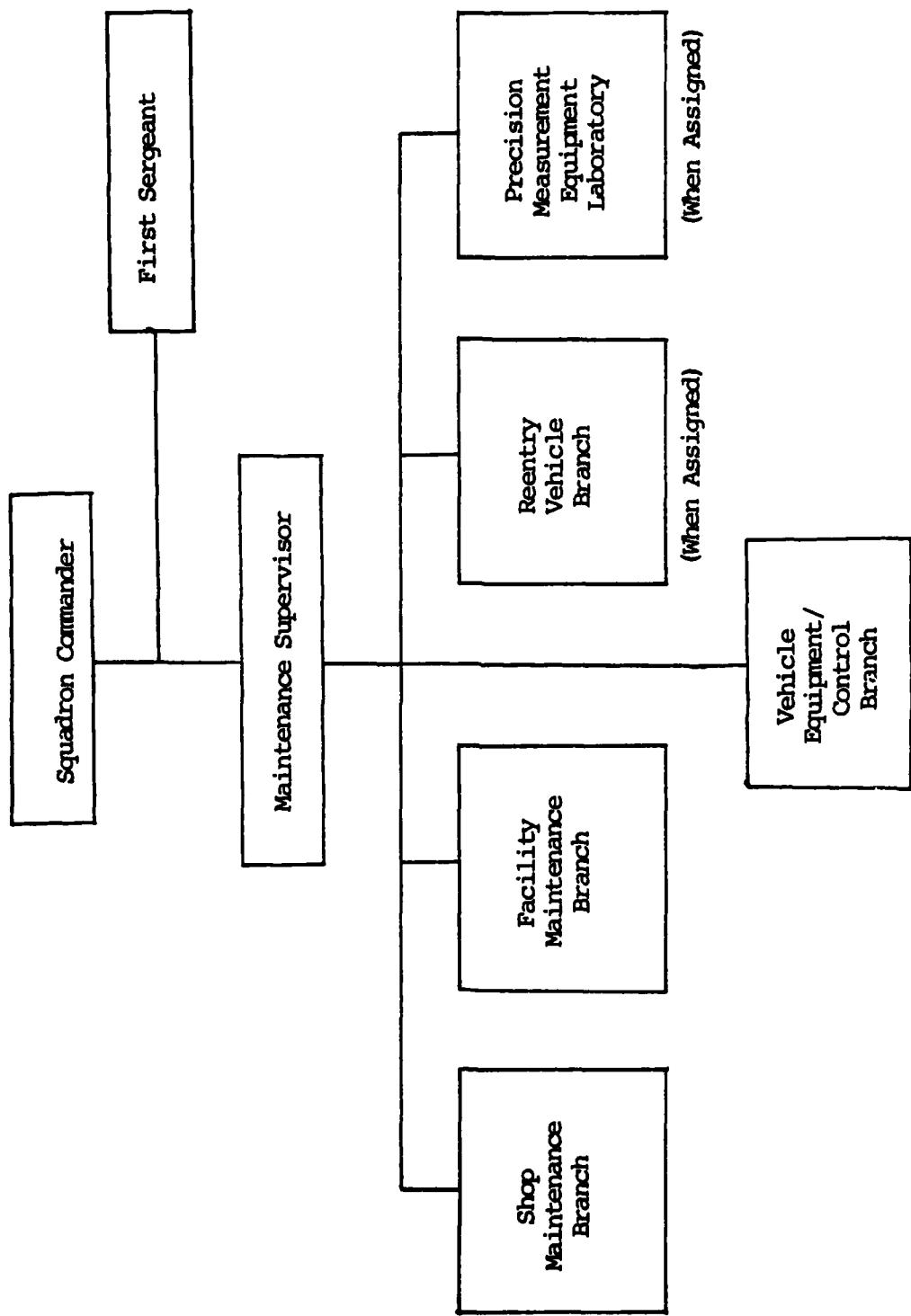


Fig. 1-3. Field Missile Maintenance Squadron

The Missile Mechanical Branch (MMB) transports, installs, and removes missiles, Reentry Vehicles, Reentry Systems, Propulsion System Rocket Engines, Emergency Rocket Communications Systems, and penetration aids sections. The Missile Handling Team (MHT) and the Missile Maintenance Team (MMT) sections perform these tasks. The Missile Electrical Branch (MEB) is made up of Electro-Mechanical Teams (EMTs) which are responsible for targeting and alignment of missiles, repair of electronic, surveillance, electrical, and access system components at LCFs and LFs. The Transient Aircraft Branch, when assigned, provides ground handling and servicing of transient aircraft. The structure of the OMMS is depicted in Figure 1-4 (31:Vol.VI.pp.3-5 to 3-6).

Justification

Several factors contribute to the importance of quality supervision in missile maintenance. These factors include the importance of quality production to meet the mission need; safety considerations; the extensive role supervision plays in the organizational structure of the maintenance complex; and the trend towards a younger, less experienced maintenance force.

The Air Force and SAC recognize that people are a manager's and supervisor's most valuable asset (31:Vol.I, p.1-4). As such, they must be properly equipped, trained, and motivated to perform quality maintenance. They must

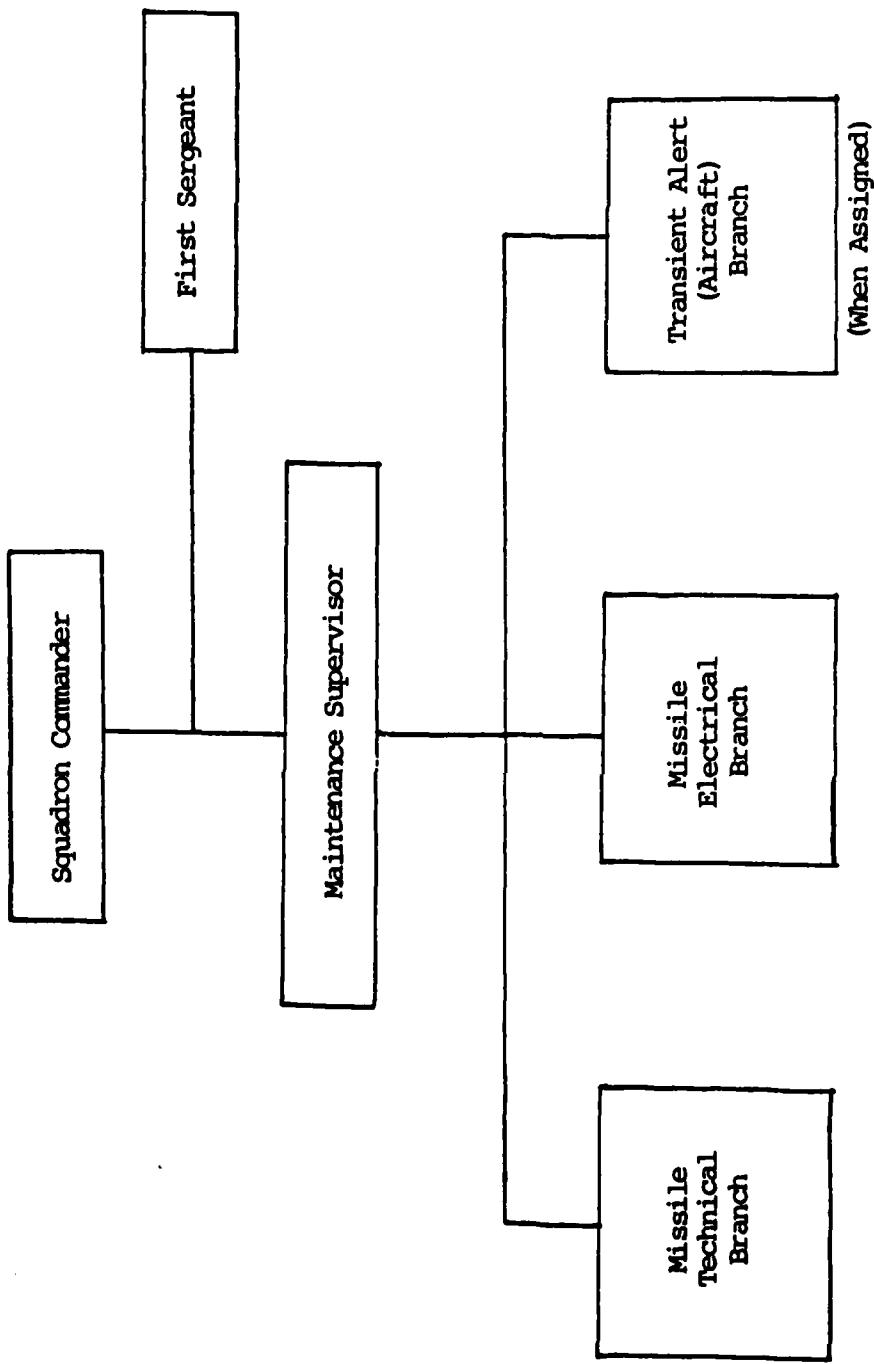


Fig. 1-4. Organizational Missile Maintenance Squadron

also work in a safe environment. Constant attention to safety considerations is a critical task of the supervisor to enhance and ensure the welfare of his subordinates.

The sheer number of supervisors involved in the chain of command, or line of authority, causes the quality of supervision to be a significant factor in the maintenance production function. An enlisted team member must go through his or her team chief, field supervisor, section chief, branch chief, squadron maintenance supervisor, and squadron commander to reach the DCM level of supervisory authority. In addition, the staff functions exert authority in terms of supervisory requirements through Training, Quality Control, Scheduling, and Job Control. This elaborate system of supervisors is necessary in the face of the numerous weapon system and safety requirements concerned.

A younger and less experienced missile maintenance force is cause for concern, since technical experience and supervisory experience is necessary to provide quality maintenance. Table 1-1 shows the force authorizations of the four principal enlisted technical AFSCs involved in missile maintenance and their actual force levels (28). In nearly every case, the experienced NCO ranks are undermanned while the younger, less experienced personnel authorizations are overmanned. The Selected Reenlistment Bonus (SRB) multipliers for each of these AFSCs is two times a

TABLE 1-1
MINUTEMAN MAINTENANCE ENLISTED FORCE STRENGTH

AFSC	Rank	Assigned	Authorized
31600	E-7	58	79
	E-6	87	134
	E-5	165	197
	E-4	228	146
	E-1 thru 3	457	299
316X2	E-7	9	8
	E-6	9	12
	E-5	23	24
	E-4	30	17
	E-1 thru 3	42	34
443X06	E-7	78	86
	E-6	134	120
	E-5	261	244
	E-4	391	280
	E-1 thru 3	530	469
445	E-7	40	57
	E-6	69	95
	E-5	155	171
	E-4	148	136
	E-1 thru 3	336	264

year's pay for the first reenlistment, and one time the base pay for each of the second and third reenlistments, indicating that the Air Force recognizes a shortage in experienced technicians and supervisors in these jobs (31:Atch.6). Quality supervision is needed to help ensure proper, safe maintenance production.

Problems in supervision, then, are of major concern to the Air Force and SAC in ICBM maintenance. SAC and each ICBM unit must identify any important personnel and supervision problems with the intent of solving them in the best way possible. One way to identify problems within the maintenance environment is through the comments and perceptions of the people who manage, supervise, and perform maintenance. Their special expertise and daily contact with these problems gives them keen insight into areas which higher-level staff and managers might miss, especially personnel, attitude, and morale problems.

Scope

In 1980, 1981, and 1982, the Air Force Human Resources Laboratory (AFHRL) at Wright-Patterson Air Force Base, Ohio, conducted a large exploratory study to identify problems within Air Force Maintenance. The study encompassed maintenance units in aircraft and missile units in SAC and other major air commands. Three Minuteman maintenance units were included: Minot, Grand Forks, and

Whiteman Air Force Base. The researchers from the AFHRL collected data from individuals at each base using a purposeful sampling plan to ensure a cross-section of opinion. The data collected was based on qualitative, open-ended interviews where the interviewee expressed his or her perceptions concerning problems in missile maintenance. A detailed description of the precise manner in which the data was collected and categorized is included in the methodology chapter of this study. This research was confined to the three Minuteman missile maintenance organizations covered by the AFHRL study.

Problem Statement

ICBM maintenance supervision is a key ingredient to effective maintenance production. As such, it is an essential element in supplying the high alert rates necessitated by the mission requirements of the SIOP. Problems in supervision that go unnoticed could lead to problems in the maintenance production effort which is so necessary to mission effectiveness. Present trends indicate that supervision may play an even more important role in ensuring quality maintenance over the long term. There is a need to find the problems that exist in supervising the SAC ICBM maintenance effort so that they can be measured and dealt with according to their severity.

Research Objectives

1. Identify problems with supervision in SAC Minuteman ICBM maintenance.
2. Obtain a greater understanding of the factors which influence supervision from the point of view of those actively involved in missile maintenance.
3. Compare the three bases with respect to supervision problems to see if problems identified are local or more general in nature.
4. Provide a base from which detailed studies about quality supervision can be launched to find the best possible solutions.

CHAPTER II

LITERATURE REVIEW

Introduction

The importance of quality maintenance to U.S. Air Force ICBM units was stated in Chapter I. Safe, high-quality, sustained equipment maintenance is required to support the high alert rates required by the SIOP. Supervision is an important part of providing that required maintenance effort. This chapter will review some of the literature concerning the supervisor's role in motivation and job satisfaction. Motivation is important to obtain high quality maintenance performance for the SAC ICBM force. Job satisfaction is important to both retention and motivation of the skilled technicians required for the maintenance effort.

Supervision and Motivation

The supervisor's job is related to the objective of Air Force maintenance: to get the work done, on time, at the least possible cost. To do this, the supervisor needs to motivate his subordinates to perform. Motivation can be viewed as being made up of attitudinal features either through traits of the workers, or through the motivational properties of the work environment. Motivational

traits of the workers include the predisposition to work, values, desires, or needs (22:411). Motivational properties of the work environment are concerned with the ways that the environment affects work behavior. Many factors which contribute to motivation have been linked to job performance, especially in the area of motivational environments, organizational size, supervision factors, and individual job factors (9:13).

Much of the literature concerning motivation is concerned with how a supervisor can extract more performance from a subordinate. For example, Locke postulates that providing clear, difficult, yet attainable, goals bring strong motivation to perform (25:157). Vroom's Valence-Instrumentality-Expectancy theory states that work effort and performance are derived from expectance of a reward contingent to perform (35). Vroom and Porter both contend that individual satisfaction is a function of the rewards received contingent upon a proportionate level of performance (29:10).

Herzberg suggests a theory of motivation based on job design. His theory states that factors that motivate are not the same as factors that demotivate, or turn off, an employee. Work context factors that relate to the work environment, called hygiene factors, will not necessarily produce motivation in individuals, but can prevent motivation. Factors such as policies and administration,

supervision style, working conditions, interpersonal relations, pay, money, status, and security can adversely affect motivation if employees perceive that they are lacking. On the other hand, these hygiene factors will not produce motivation, at least for more than a short period of time. Motivator factors, such as achievement, recognition, challenging work, increased responsibility, advancement, and personal growth, motivate through the content of the work itself. Both hygiene and motivator factors must be present to produce motivation. By providing the hygiene factors to the extent that the workers are satisfied and by providing motivating job design, supervisors can effectively motivate people through the relationship between the job content and the feelings of the worker (8:145-146).

Hackman and Oldham suggest another model which provides a link between motivation factors and job satisfaction. Their job characteristics model states that certain job core characteristics lead to critical psychological states which influence behavioral outcomes of employees. Figure 2-1 shows a diagram of the model and its relationships (17:90). The core job characteristics of skill variety, task identity, task significance, autonomy, and feedback provide high motivating potential within the job context. Individuals with high growth need strength should respond to these core dimensions and experience strong

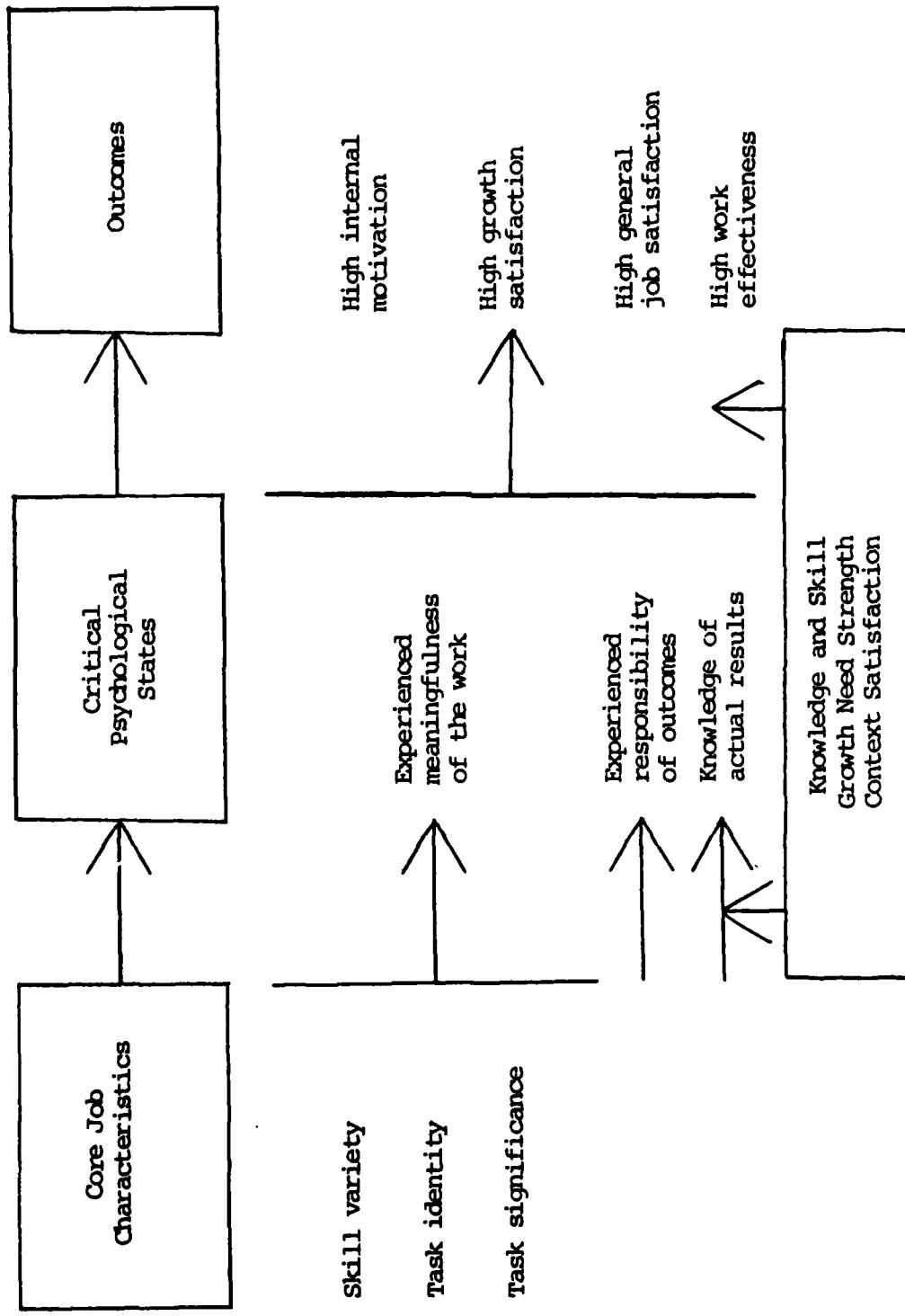


Fig. 2-1. Hackman and Oldham's Job Characteristics Model

psychological states, or feelings, namely experienced meaningfulness of the work, experienced responsibility for outcomes of the work, and knowledge of the actual results of the work (contingent on feedback). These states can then be manifested through work outcomes, such as increased high internal work motivation, high growth satisfaction, high general job satisfaction, and high work effectiveness. Moderating factors, such as knowledge and skill, growth need strength, and context satisfactions can affect the degree to which the core dimensions affect the strength of the critical psychological states and their operationalization into work outcomes. These context factors, including satisfaction with pay, security, co-workers and supervision, can greatly affect the degree of employee response to the core dimensions (17:77-91).

Hall also puts forth a model based on a similar concept: that under certain conditions goal-directed behavior leads to psychological, or self perceived intrinsic success feelings. A diagram of this model is shown in Figure 2-2 (18:126). According to Hall, the conditions for psychological success include a certain degree of objective challenge, autonomy, and feedback, setting one's own goals, and independent effort. The working of this model depends on certain conditions contingent on the supervisor. According to a study by Hall and Schneider, supervisors have a great deal of influence over the

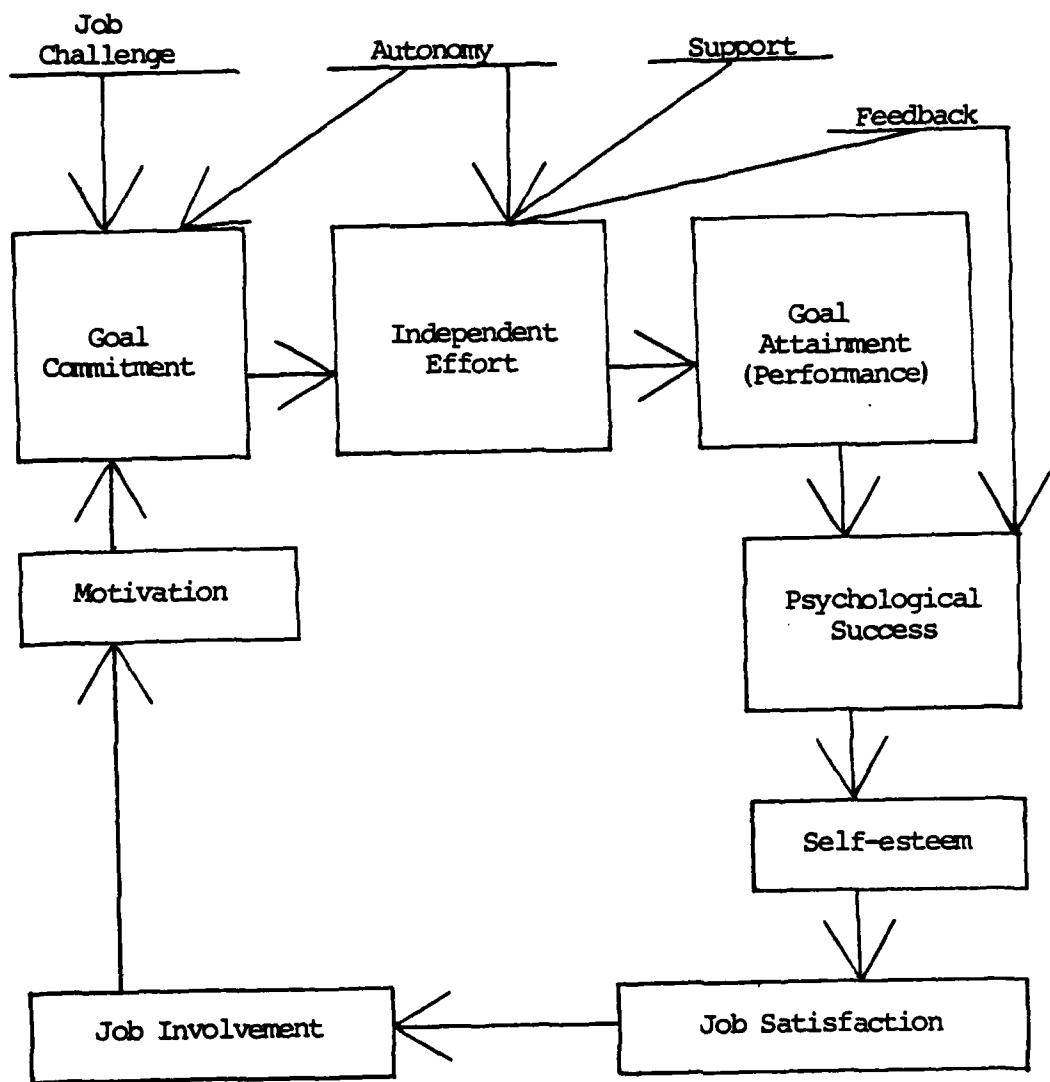


Fig. 2-2. Hall's Model of Psychological Success

objective challenge, autonomy, feedback, and support of the person on the job. Supervisors affect outcomes through supervisory style and other influences on work climate and contextual satisfiers. The contextual satisfiers act as intervening variables between motivation and satisfaction (18:126-128).

Motivation, then, is the drive to perform a job. A theme common to the theories of Herzberg, Hall, and Hackman and Oldham is that the supervisor can affect motivation in two principal ways. First, by providing satisfaction with work context factors such as supervisory style, working conditions, and other factors which affect the work climate, the supervisor can foster a positive (or at least not negative) attitude in employees toward their work. Second, by providing factors in job design such as interesting and challenging work, clarity, autonomy, feedback, and other factors which serve to actually motivate people, the supervisor can influence the content of the work.

Supervision and Job Satisfaction

Supervision is a key element in providing a motivating environment for subordinates, not only by providing the elements of motivating job design, but also by providing contextual job satisfaction within the work environment. The supervisor's job, then, includes ensuring satisfaction of his subordinates within the structure of

the job. In order to understand how a supervisor can affect worker job satisfaction, a discussion of the job satisfaction phenomenon is appropriate.

Most often, job satisfaction is termed an attitude of like or dislike of a person towards his or her job (22:410). Many definitions include "morale" as an interchangeable term (35:20), while others omit it by classing morale as a group attitude or phenomena much like "esprit de corps" (7:150). Job satisfaction is viewed as multidimensional, including attitudes toward the overall job as well as attitudes toward specific facets of the job. Job satisfaction is considered most often to be made up of several factors:

(1) attitudes toward work group, (2) general working conditions, (3) attitude toward the company, (4) monetary benefits, and (5) attitudes toward supervision [2:22].

Since this study focuses on individual perceptions and attitudes about supervision, a differentiation between group morale and individual job satisfaction is appropriate.

One traditional approach to visualizing job satisfaction is through a continuum, with job satisfaction and job dissatisfaction as polar opposites. The individual moves along the continuum in response to changes in the factors which affect his or her level of satisfaction (1:322).

Another approach is Herzberg's two-factor theory in which two continuums exist, one for job satisfaction and

the other for job dissatisfaction. According to this theory, hygiene factors affect the level of job dissatisfaction. Hygiene factors are composed of things like organization policy, working conditions, and technical supervision. Motivator factors, referring to the intrinsic aspects of the work itself, affect the level of job satisfaction. Motivator factors include the degree of satisfaction and self-actualization derived from doing the work itself. Implicit in Herzberg's theory is the contention that greater worker satisfaction will lead to increased performance (19:115-116,118,126). Much study has been conducted on Herzberg's theory, with many researchers disputing his contention that hygiene factors do not affect job satisfaction but do affect job dissatisfaction (36:41).

Many studies have been conducted concerning the relationship between job satisfaction and performance. Most of the studies failed to show a significant relationship between the two (6:346-424). However, research has found that satisfaction results from rewards contingent on performance (29:1-10).

Job satisfaction correlates negatively to turnover and absenteeism (9:22). Work-related factors, including the amount of feedback, autonomy, responsibility, and people-oriented leadership factors are negatively related to turnover (26:43,58-59,63). Turnover behavior was found to be strongly related to intentions to search for

alternatives, which in turn was predictable by job satisfaction (3:350). Turnover and absenteeism can affect the long-term profitability and effectiveness of an organization through costs of training new personnel and time lost due to absenteeism and work adjustment periods for new personnel (9:22). A study by Hom and Hulin on reenlistment intentions showed that several factors in supervision correlate with reenlistment intention. Consideration by commanding officer and first sergeant and structure provided by commander and first sergeant were significant positive correlators of intention to reenlist. Officer support and satisfaction with immediate supervisors and first sergeants were also significant positive correlates of reenlistment intention, while officer control was a significant negative correlate of reenlistment intention (20:30-31,34).

Motivational tools and leader behavior may not always bring about changes in productivity, motivation, and morale. As stated earlier, the general relationship between performance and satisfaction is weak even though satisfaction may contribute to organizational effectiveness. Griffin found that there seems to exist significant relationships between leadership behavior variables and satisfaction, but not necessarily productivity. Thus, the primary impact of an appropriate supervisory behavior is more effective toward attitudes than toward behavior (15:665).

The supervisor-subordinate relationship has often been cited as a key element in expressed worker satisfaction. This is manifested through either the consideration given the worker by the supervisor, or through the employee's perception that agreement exists between the supervisor and employee on how work should be done (4: 14-17). Participative management in an organization is not only considered an important tool for motivation and increasing performance but also a factor in increasing the level of job satisfaction (7:9). Increased involvement with the goals of an organization has also been found to raise satisfaction (24:77). Competence, experience, technical expertise, and other elements which lead to supervisor credibility also play an important role in job satisfaction (9:15).

Looking deeper into the supervisor-subordinate aspect of satisfaction, the quality of the supervisor-subordinate relationship seems to have an effect on both motivation and satisfaction. Liden and Graen found that subordinates who reported good rapport with their bosses seemed to contribute more to their work group, to assume more job responsibility, and to generally rate as higher performers than those who did not (13:451). In another study, the leader-member exchange was cited as a significant factor in producing gains in satisfaction and productivity in a public service organization (14:109).

Klimoski found that the impact of managerial behavior on motivational job design was important in that supervisory behavior influenced effort expenditure, job performance, and many facets of job satisfaction (23:543). In a study by Paul and Gross, management-initiated organizational development led to both increased productivity and to job satisfaction. Through interviews, team-building workshops, counseling, process consultancy, and management training, organizational productivity and job satisfaction was increased significantly (16:59).

Job satisfaction, then, is an attitude of an individual toward his or her work. The supervisor affects job satisfaction in many ways. High levels of supervisory support, consideration toward employees, and other factors of supervisory style which contribute to good rapport between supervisors and subordinates increases individual satisfaction. Technical expertise, competence, experience, and other factors which lead to supervisor credibility also affect job satisfaction. The supervisor also affects job satisfaction by impacting job design and through participative goal-setting. All these ways that a supervisor impacts job satisfaction are important to set the stage for producing motivation and to retain satisfied, committed employees.

Conclusion

Motivation is the individual's drive to perform. Job satisfaction is the individual's attitude concerning the work situation. Job satisfaction is important to motivation because lack of job satisfaction can adversely affect motivation and retention. The presence of job satisfaction does not guarantee motivated people will have increased performance. Supervision can affect both job satisfaction and motivation. Supervisory style, credibility, and impacts on job design can help produce satisfaction. Satisfaction needs to be present in an individual to obtain the full effects of motivating job design. Supervision also affects motivating job designs to produce motivated workers. The end result can be a high performance organization made up of motivated, committed, and satisfied individuals.

CHAPTER III

METHODOLOGY

Introduction

This study has four objectives: identify problems, obtain a better understanding of factors, provide a base for further study, and compare sampled bases. Three of these objectives, identify, understand, and provide a base, are basically exploratory actions. Qualitative methodology is appropriate to this study because the emphasis is on discovery of problems, ideas, and insights. In addition to this emphasis, the detailed description of how these problems, ideas, and insights fit into a unique environment within Air Force maintenance is important.

Many exploratory studies have the purpose of formulating a problem for more precise investigation or of developing hypotheses. An exploratory study may, however, have other functions: increasing the investigator's familiarity with the phenomenon he wishes to investigate in a subsequent, more highly structured study, or with the setting in which he plans to carry out such a study; clarifying concepts; establishing priorities for further research; gathering information about practical possibilities for carrying out research in real-life settings; providing a census of problems regarded as urgent by people working in a given field of social relations [30:51].

This study is based on qualitative, rather than quantitative, data. There should be no argument implied that qualitative may be better or worse than quantitative

methods, rather an understanding that there are situations when qualitative methods are more appropriate.

Qualitative data consist of detailed descriptions of situations, events, people, interactions, and observed behaviors; direct quotations from people about their experiences, attitudes, beliefs, and thoughts. . . . The data are collected as open-ended narrative without attempting to fit program activities or peoples' experiences into predetermined, standardized categories such as the response choices that comprise typical questionnaires or tests [27:22].

A standard survey or questionnaire with predetermined subject categories could bias the responses to fit a researcher's model or preconception of problems in the maintenance environment. Since a holistic view of missile maintenance supervision is desirable, and given the goals of the study, qualitative methods were employed. Patton states the appropriateness of using qualitative methods as follows:

Quantitative measures are succinct, parsimonious, and easily aggregated for analysis; quantitative data are systematic, standardized, and easily presented in a short space. By contrast, the qualitative measures are longer, more detailed, and variable in content; analysis is difficult because responses are neither systematic nor standardized. Yet the open-ended responses permit one to understand the world as seen by the respondents. The purpose of gathering responses to open-ended questions is to enable the researcher to understand and capture the points of view of other people without predetermining those points of view through prior selection of questionnaire categories [27:28].

The understanding of points of view and of the environment is critical to the value of this study, since it is based on the assumption that the perceptions of people actively involved in the study setting are important

sources for problem identification and solution. This assumption is similar to the primary assumption of quality circles, a popular concept used in industry. Through quality circles, groups of employees get together to identify, study, and solve problems in their own work environment through their own specialized knowledge of the problem and their environment. The success of quality circles has proved that workers have important insights into problems in the work environment, and that management would do well to utilize these insights in identifying, understanding, and solving problems (12:71). This study attempts to use that same resource to identify and understand problems concerning supervision within Air Force ICBM maintenance environment.

The AFHRL conducted the parent study for this research with many of the same goals as this study in mind. In that study personnel were interviewed in three phases: active duty aircraft units, Air Force Reserve and Air National Guard units, and missile units (11:3). The data for this study was obtained from the missile portion of the AFHRL interview responses through the AFHRL, Wright-Patterson AFB, Ohio. What follows is a description of how the AFHRL obtained and categorized the data.

AFHRL Procedures

Planning and Pretests

To ensure that the open-ended interview technique would provide the desired quantity and quality of data, the AFHRL conducted three pretests. Interview techniques and coding forms were developed and modified throughout the pretest phase so that data collection and reduction would be as efficient as possible. To eliminate the possibility of interviewer preconceptions entering into the interview, only general questions about subjects such as things that would improve Air Force maintenance or that interfere with doing maintenance jobs were asked. A prompting list (Figure 3-1) was developed for use in cases where the subject interviewed had talked only about one topic or did not grasp the purpose of the interview (11:6).

The pretests consisted of a one-day tryout at the 178th Tactical Fighter Group, Ohio National Guard, in Springfield, Ohio; a one-week tryout at the 1st Tactical Fighter Wing at Langley AFB; and a full-scale pretest at the 314th Tactical Airlift Wing, Little Rock AFB, Arkansas. The full-scale pretest included the use of data collection procedures and forms, data reduction, and data analysis. All of the pretests were conducted from 4 April 1980 to 19 September 1980 by AFHRL researchers (10:3-4).

The categorization system was begun from the data collected at the pretests. This system was completely

Technician Needs

Technical Competence

Self
Experience
Training--Technical School
On-the-Job Training
Field Training Detachment
Cross Utilization Training
Career Development Course
Professional Military
Education

Others

Technicians
Supervisors
Officers

Motivation

Job Satisfaction
Job Status
Job Involvement/Caring
Identification with Unit
Desire to do a Complete Job
Patriotism
Feedback
Discipline/Conformity
Off Duty Factors--Living
Conditions, Housing
Recreation, Social
Interactions

Equipment Support

Hand Tools
Test Equipment
Aerospace Ground
Equipment
Automatic Test
Special Tools
Protective Clothing
Spare Parts
Bench Stock
Prime Equipment

Methods Support

Troubleshooting Procedures
Technical Orders
Inspection Work Cards
Maintenance Office
Instructions
Local Work Rules
Regulations
Forms Preparation
Job Scheduling

Work Environment

Physical
Cold/Heat
Lighting
Noise
Space/Facilities
Transportation

Psychological
Supervision
Work Pressure

Organizational
Job Structure
Combat Oriented
Maintenance
Organization/66-1
Work Distractions/
Non-Maintenance Duties

Personnel Policy

Selection
Promotion
Assignment
Retention
Transfer
Pay
Benefits
Enlisted Incentives

Fig. 3-1. Technician Needs Prompting Device

data-driven, and no preconceived model of maintenance was used to manipulate the data. Figure 3-2 shows the categorization scheme used, with the index numbers used for computer retrieval (11:8).

Data Collection

Approximately 100 interviews were conducted by AFHRL personnel at each of 16 aircraft maintenance units and approximately 53 interviews at each of four missile bases. Each interview was approximately one hour in length in which only open-ended questions were used to obtain responses from the subject. Once responses from the subject were obtained the interviewer asked clarifying questions to explore topics chosen by the subject. Each interview was a one-on-one process and started by the interviewer outlining the project goals, explaining the voluntary confidential nature of the project, and asking the subject to sign a Privacy Act statement. Subjects were allowed to retain a copy of the Privacy Act form if desired. The interviewer then filled out a biographical data sheet on the subject and the interviewer began the interview, using a checklist to use in conducting the interview (10:9). Figures 3-3, 3-4, and 3-5 show the Privacy Act, biographical data, and interview guideline forms (10:15-17). Statements were recorded by taking notes. Immediately following the interview the interviewer transcribed the notes onto

PRIVACY ACT STATEMENT

In accordance with paragraph 30, AFR 12-35, the following information is provided as required by the Privacy Act of 1974.

A. This interview is part of an effort by the Air Force Human Resources Laboratory (AFHRL) to explore various alternatives for improving maintenance operations. The interview provides an avenue of communications between the individuals directly involved in maintaining Air Force equipment and AFHRL. The information gathered in these interviews will be used to generate possible improvements in maintenance and personnel procedures and environment.

B. Your participation in this interview is entirely voluntary. If you choose to participate, you are encouraged to provide complete and accurate information, in the interests of improving the maintenance job and the psychological climate in which it is performed. However, no adverse action of any kind will be taken against any individual who declines to provide any or all of the information requested.

C. Your participation in this study will be strictly anonymous. The information you provide will be combined with information from other participants. Full confidentiality of your responses will be maintained in processing the data and in reporting the results. Your name or organization will not be associated with the information you provide in any resulting report.

D. If you choose to participate in this interview, please sign below to indicate that you have read this statement.

E. If you wish, you may retain a copy of this notice. Simply detach and keep the second sheet of this form.

Signature _____ Date _____

Fig. 3-3. Privacy Act Statement

01 COMPETENCE	02 16 Educational Opportunities	05 01 PHYSICAL	06 01 Selection into AF
01 01 Profession	02 17 Family Life/Personal Life (wife, 1st and TDY, overtime, PCS, etc.)	05 01 01 Cold/Heat	06 02 Promotion
01 02 Supervision	02 18 Base Services (e.g., Hospital, day care)	05 01 02 Lighting	06 02 01 Criteria/APRs
01 03 Children	02 19 Documentation	05 01 03 Noise	06 02 02 Frequency
01 04 Contracts	02 19 01 Sea	05 01 04 Space/Facilities/Rest Rooms	06 02 03 SKT's
01 05 Men vs. Women	02 19 02 Race	05 01 05 Transportation	06 02 04 WAFPS
01 06 Education (DRI) Intelligence	02 19 03 Marital Status	05 01 06 Serviceability	06 02 05 "Up or Out"/High Year of Tenure
01 07 Experience	02 19 04 Civilian/Military	05 01 05 02 Availability	06 02 Career Path Availability
01 08 Training	02 19 05 Rank	05 01 06 Drive/Graze	06 02 Below the Zone
01 09 01 Tech School	02 19 06 Maintenance vs. Other	05 02 01 PSYCHOLOGICAL	06 02 Local Authority
01 09 02 Out	02 20 Drug/Alcohol Abuse	05 02 01 Supervisory Style/Techniques	06 02 Assignment (AFSC, Primary Job)
01 08 03 FID	03 EQUIPMENT SUPPORT	05 02 01 NCOs	06 04 Retention
01 08 04 CUT	03 01 Hand Tools	05 02 01 01 Maintenance Officers	06 04 Transfer (PCPS)
01 08 05 CDC	03 02 Test Equipment	05 02 01 02 Sustainment Commander	06 01 Frequency
01 08 06 Management, PME	03 03 AGE	05 02 01 03 DCM and Higher Management	06 03 Involuntary Transfer
01 08 07 Basic	03 04 Automatic Test Equipment	05 02 02 Work Pressure	06 05 Duration of Stay
01 08 08 Auxiliary/Annual Safety/Augmentee	03 05 Special Tools	05 02 02 01 Flying Schedule	06 05 04 Spouse
01 08 09 Officer	03 06 Safety Equipment	05 02 02 02 Requirement for Perfection	06 05 PAY
01 08 10 Human Relations	03 07 Protective Clothing	05 02 02 03 Deadlines/Indiscrete Time	06 05 01 Basic Rate and Effects
01 08 11 Proficiency/Advanced	03 08 Warm Clothing/Protectors	05 02 02 04 Mobility Exercises	06 05 01 01 Food Stamps
02 MOTIVATION/MORALE	03 09 Weapons System	05 02 02 05 TDY	06 05 01 02 Working Schedule
02 01 Job Satisfaction	03 09 01 Prime Equipment	05 02 02 Length of Work Days/Weeks/Shifts	06 05 01 03 Moonlighting
02 02 Career/Job Satisfaction	03 09 02 Subsystems	05 02 02 01 Inspections (ORI, ORE, CAFI, QC, MSEPI)	06 06 02 BAS/RAO
02 03 Job Satisfaction/Visibility	03 09 03 Support Systems	05 02 03 Work Distractions/Non-Primary Duties	06 06 03 Incentive (Flight, Hazardous Duty)
02 04 Desire to Do Responsible, Meaningful Work	03 09 04 Age/Obsolescence	05 02 03 01 Details (up to 1 week)	06 06 04 Clothing Allowance
02 05 Desire to Do a Complete Job	03 09 05 Design for Maintainability	05 02 03 02 Temporary Duties (up to 90 days)	06 07 01 CHAMPUS Health Benefits
02 06 Job Satisfaction/Concern/Career/Retiring on the Job	03 09 06 Accessibility	05 02 03 02 Extra Duties (concurrent)	06 07 02 Tuner Assistance
02 07 Unit Identification/Altruism/Pride	03 09 07 Ease of Troubleshooting/ITE	05 02 03 03 Training (e.g., General Military Training)	06 07 03 Reimbursement of PCS Expenses
02 08 Respect for Supervisors/Role Models	03 09 08 Ease of Replacement	05 02 03 04 Adminstrative Paperwork	06 07 04 Housing Referral OIC/Sponsor Program
02 09 Feedback	03 09 09 Procurement	05 02 03 05 Appointments (e.g., records check, dental)	06 07 05 BX & Commissary
02 09 01 Information	03 10 Spare Parts	05 02 03 06 Meetings	06 07 06 Retirement Bonus/Leave Buy Back
02 09 02 Evaluation/Appearance/Appearance	03 10 01 Availability	05 02 03 07 Overseas COLA	06 07 07 Overseas Separation
02 09 03 Awards and Rewards	03 10 02 Serviceability (Spares that don't work)	05 02 03 08 Leave	06 08 01 Enlistment/Reenlistment Incentives
02 10 Reasons for Remaining on AF	03 10 03 Reliability (Spares that fail quickly)	05 02 03 09 Vertical Communication	06 08 02 Commodity/Kitting/Inventory
02 10 01 Patriotism	03 10 04 Maintenance Concept	05 02 03 09 01 Organizational Structure	06 08 03 Base of Preference
02 10 02 Job Security, "Sticky" Pay	03 10 05 Procurement	05 03 01 Maintenance Organizational Structure	06 08 04 VAFP/G.I. Bill
02 10 03 Enhancing Experience	03 10 06 Normal	05 03 01 01 POHO (68.5)	06 08 05 Recruiting/Indoctrination
02 10 04 Desire to Learn a Trade	03 10 07 Local Purchase	05 03 01 02 01 06	06 08 06 10 Involuntary Separation
02 11 Competition/Competitors/Conflicts (among individuals or units)	03 10 08 Cannibalization	05 03 01 02 02 03 07	06 08 07 11 Draft, All Volunteer Force
02 12 01 Exercise	03 11 Misinformation	05 03 01 03 Crew Chief System	06 08 08 12 Weight Program
02 12 02 Insufficient	04 01 TO's	05 03 01 04 Job Control	06 08 09 13 AFR 35.10
02 12 03 Consistency	04 01 02 Repair/Replacement Procedures	05 03 01 05 Quality Control	06 08 10 14 Social Actions/EDOT
02 13 Living Conditions	04 01 02 Computer Maint. Management Aids	05 03 01 06 Span of Control	
02 13 01 Off Base Housing	04 01 02 Repair/Replacement Procedures	05 03 01 07 Unity of Direction/Command	
02 13 02 On Base Housing	04 01 03 IPB/Working Diagrams/Schematics	05 03 02 01 Job Structure	
02 13 03 Family Housing	04 02 Inspection Work Cards	05 03 02 02 01 AFSCs	
02 13 04 Quality	04 03 Forms	05 03 02 02 Duties within AFSCs	
02 13 05 Privacy	04 04 Suggestion Program/AFTO 22's	05 03 02 03 Unpleasant Duties	
02 13 06 Noise, Noise/Space	04 04 05 Computer Maint. Management Aids	05 03 02 04 Unwanted Supervisory Role	
02 13 07 02 03 Inspections	04 04 06 Job Scheduling	05 04 01 Technicians	
02 13 08 02 03 04 Family Housing	04 04 07 MOIs	05 04 02 Supervisors	
02 13 09 03 01 Quality	04 04 08 Local Work Rules (unwritten)	05 04 03 Officers	
02 13 07 02 01 Privacy	04 04 09 Regulations	05 05 SAFETY	
02 13 08 02 01 Schedule	04 04 10 Tool Management Procedures (CTK)	05 05 01 Physical	
02 13 09 03 Availability	04 04 11 Supply Procedures	05 05 02 Preventive	
02 14 Preparation		05 06 MISSION/VAIR READINESS	
02 15 Social Interactions/Social Environment		05 07 Too general a statement	
		05 08 New category needed	

Figure 3-2. Statement Categorization Scheme--Phase III

INTERVIEW PROCEDURES

1. Introduce yourself and organization.
2. Briefly discuss project goals.
3. Stress confidentiality and voluntary participation.
4. Present Privacy Act Statement.
5. Collect biographical data.
6. Ask what kind of work subject does.
7. Ask: What do you think could be done to improve Air Force maintenance?

What do you think could improve your work and attitude on the job?

What do you think is the best thing about this squadron? The Air Force in general?
8. If subject "runs down" within the first half hour, present the "Technician Needs" list and say: "This is a list of topics we believe has some of the important factors in Air Force maintenance. We would like you to take a look at it and see if there is anything else there you'd want to comment on. You certainly do not have to talk about any of these."
9. Thank the subject.

Fig. 3-4. Interview Procedures

0026 BIOGRAPHICAL DATA

(1) BASE CODE: _____ NAME: _____ (2) SUBJ #: _____

(3) AGE: _____ (4) SEX: _____ (5) RACE: _____ (6) MAR. STATUS: _____

(7) MIL. SPOUSE: _____ (8) # DEP. CHILD. _____

(9) PREFIX: _____ (10) AFSC: _____ (11) SUFFIX: _____ (12) SEI: _____

(13) JOB TITLE: _____

(14) MIL/CIV CODE: _____ (15) MIL GRADE: _____ (16) CIV GRADE: _____

(17) DUTY TYPE: _____ (18) AFRES/ANG STATUS: _____

(19) TIME IN SERVICE: _____ months (20) TIME IN MAINT: _____ months

(21) TIME SINCE HANDS-ON: _____ months (22) TIME IN SUPV: _____ months

(23) R/A TIME IN ACTIVE DUTY: _____ (24) R/A TIME SINCE AC. DTY: _____

(25) CMD/AGCY CODE: _____ (26) CMD LEVEL CODE: _____

(27) ORGANIZATION-POSITION DATA: 66-5 (1) _____ 66-1 (2) _____

DCM (01) _____ MMICS (02) _____ ADMIN (03) _____ PRO/MOB (04) _____

TING. MGT (05) _____ PROD. ANAL (06) _____ QC/QA (07) _____

PLANS/SCHED-DOC (08) _____ JOB CON (09) _____ MAT CON (10) _____

AGS (21) _____ EMS (22) _____ CRS (23) _____

OMS (31) _____ FMS (32) _____ AMS (33) _____ MMS (34) _____

UNCODEABLE (44) _____ (28) SUPPLEMENT: _____

(29) SQUADRON: _____ (30) WEAPONS SYSTEMS: _____

(31) INT. DATE: _____ y _____ m _____ d (32) TIME: _____

(33) INTERVIEWER: _____

Fig. 3-5. Biographical Data Form

coding forms and categorized the responses. Figure 3-6 shows the forms used in this process (10:18).

Each statement was allowed to fit up to three categories if the statement covered more than one subject area. As a result, a statement made about job satisfaction might also be classed in organizational commitment and retention categories (10:18).

Sampling

Since the emphasis was on obtaining data from all levels of the maintenance complex and from each specialty, some purposive and some random sampling was used. Certain specialties were interviewed at every base. Several names were randomly selected from a personnel roster obtained from the AFHRL data base at Brooks AFB in each of the desired Air Force specialty codes (AFSCs). A list of the individuals thus chosen was then sent to each of the bases, with the understanding that the named individuals be made available for interviewing as schedules permitted (10:9).

Data Analysis Methodology

The data for this study is limited to the three Minuteman missile bases contained in the AFHRL data. The analysis includes a summary of all three bases and individual analysis of each base. The analysis began by obtaining a printout of the data for the bases and categories desired. While reading each statement, key words which

INTERVIEWER'S NOTES	
Statement 1	_____
Statement 2	_____
Statement 3	_____
TRANSCRIBED STATEMENT	
Categories:	
01 07	Experience
05 04 01	Manpower Avail
06 04	Retention
Biographical Data:	
Age	_____
Sex	_____
AFSC	_____
Time in Service	_____
Etc.	_____

Fig. 3-6. Example of Transcription and Coding Forms

most aptly expressed the topic of the statement were highlighted. As this process continued, various themes began to emerge. After all the statements in a particular theme had been identified, a score according to base and category was kept to differentiate between categories, both overall and between bases.

A result of the above analysis is an integrated summary of the three bases, showing the number of statements concerning a topic as the level of concern for a problem in that area. It should be pointed out that only statements considered as expressing a negative reaction to a phenomena or concern for a problem are included, since the emphasis is on identifying and prioritizing problems.

Another result of the analysis is an individual summary of each of the three bases, with the number of statements about a theme or topic used as the expressed level of concern. This is used to differentiate between the bases and discern if similar problems are of equal or unequal concern at the three bases.

Finally, a paragraph summary explaining the problem areas identified and the characteristics of each area as expressed by the subjects' statements is included to lend greater understanding to the problem areas themselves.

The categories chosen for analysis all concern perceptions of the interviewees concerning supervision as related to job satisfaction and motivation. As explained

in the introduction and in the literature review, supervision plays a key role in quality maintenance production and in the job satisfaction and motivation of the line personnel responsible for that production. Specifically, categories were chosen that had particular bearing on: supervisory style including support, consideration, and discipline; supervisory credibility, including supervisory training, technical expertise, competence, and experience; satisfaction with job design and how supervision impacts the job design such as support, autonomy, clarity, challenge, and goal acceptance. Figure 3-7 shows the categories chosen for analysis.

One comparison of the three bases is made by comparing the raw score of responses in a topic area expressed as a percentage of the total responses in that area over the three bases. Another comparative test is through the Friedman F_r test for a randomized block design. In this test, the number of responses in a topic area is expressed as a percentage of the total number of responses over the three bases in this study. The data are placed in treatments by base and in blocks according to category or topic area. The test is then conducted to determine if the three bases are significantly different in their responses or not. The outline of the test follows.

Supervisor Credibility

Supervisor Competence
Officer Competence
Officer Training
Management/PME (Professional Military Education) Training
Respect for Supervisors/Role Models

Job Design/Motivation

Desire to do Responsible, Meaningful Work
Desire to do a complete job
Job Involvement/Caring/Retiring on the Job
Feedback
Job-Task Satisfaction

Supervisory Style

General Supervisory Style
NCO Supervisory Style
Maintenance Officer Supervisory Style
Squadron Commander Supervisory Style
DCM and Higher Management Supervisory Style
Discipline
Work Pressure:
 Requirement for perfection
 Length of work shift/day/week

Fig. 3-7. Categories Chosen for Analysis

1. Null hypothesis: the probability distributions of the response rates are identical for the three bases.

2. Alternate hypothesis: at least two of the probability distributions differ.

3. Test statistic:

$$F_r = \frac{12}{bk(k+1)} \sum_{j=1}^k R_j^2 - 3b(k+1)$$

where

b = the number of topic areas (blocks),

k = the number of bases (treatments), and

R = the rank sum of the jth treatment, computed relative to its own block.

4. Assumptions:

a. The treatments are randomly assigned within the blocks.

b. The measurements can be ranked within the blocks.

c. The number of blocks or treatments must be greater than five to ensure adequate chi-square approximation.

5. Rejection region:

$$F_r > \chi_{\alpha}^2 \text{ with } (k-1) \text{ degrees of freedom (5:699).}$$

From the above data analysis, the research objectives of the study should be attained. Problems in the SAC ICBM maintenance complex with respect to supervision

will be identified and factors which affect them should be more clearly understood. A comparison of the three bases may serve to indicate the generalness or specificity of problems, and a base of identifiable problems will be available to start more quantifiable studies or initiate change from.

CHAPTER IV

RESULTS

Introduction

The results of this study are in three forms: relative frequencies, the Friedman F_r test, and the descriptive summaries. The tabular formats and histograms depict the relative frequency of comments in each topic category for each base and over the entire three-base sample. Expressed in raw numerical and percentage terms, these frequencies can help show the relative level of concern perceived for each of the categories. The Friedman F_r test determines whether or not the three sampled bases have approximately the same amount of concern for each category. In other words, this test shows if the concern of individuals is distributed the same at each of the three bases. The descriptive summaries express the specific problems perceived as a trend or theme in each category by each base and over the whole sample.

Relative Frequencies

Tables 4-1 and 4-2 show the relative frequency of statements made in each category, expressed as raw frequency and as percent respectively. Figures 4-1, 4-2, 4-3, and 4-4 depict the frequencies graphically by base and overall, respectively.

TABLE 4-1
FREQUENCIES OF RESPONSES

Category	Frequencies			
	Overall	Base A	Base B	Base C
Supervisor Competence	12	3	6	3
Officer Competence	34	7	20	7
Officer Training	15	2	8	5
Management/PME Training	10	2	3	5
Respect for Supervisors	11	3	1	7
Responsible Work Desire	58	14	23	21
Desire to Complete/Care	23	8	3	12
Feedback	30	9	15	6
Job-Task Satisfaction	25	5	10	10
Supervisor Style--General	14	1	8	5
Supervisory Style--NCO	28	10	7	11
Supervisory Style--Officers	12	3	3	4
Supervisory Style--Sq. Cmdr.	9	2	3	4
Supervisory Style--DCM	90	27	42	21
Discipline	25	9	8	8
Pressure for Perfection	12	7	1	4
Work Pressure--Hours	57	19	21	17
TOTAL	465	131	184	150

TABLE 4-2
PERCENTAGE FREQUENCIES OF RESPONSES

Category	Overall	Base A	Base B	Base C
Supervisor Competence	.026	.022	.033	.02
Officer Competence	.073	.053	.109	.047
Officer Training	.032	.015	.043	.033
Management/PME Training	.022	.015	.016	.033
Respect for Supervisors	.024	.022	.005	.047
Responsible Work Desire	.125	.107	.125	.14
Desire to Complete/Care	.049	.061	.016	.08
Feedback	.065	.069	.082	.04
Job-Task Satisfaction	.054	.038	.054	.067
Supervisor Style--General	.030	.008	.043	.033
Supervisory Style--NCO	.060	.076	.038	.073
Supervisory Style--Officers	.026	.022	.027	.027
Supervisory Style--Sq. Cmdr.	.019	.015	.016	.027
Supervisory Style--DCM	.194	.206	.228	.14
Discipline	.054	.069	.043	.053
Pressure for Perfection	.025	.053	.005	.027
Work Pressure-- Hours	.123	.145	.114	.113
TOTAL	1.00	1.00	1.00	1.00

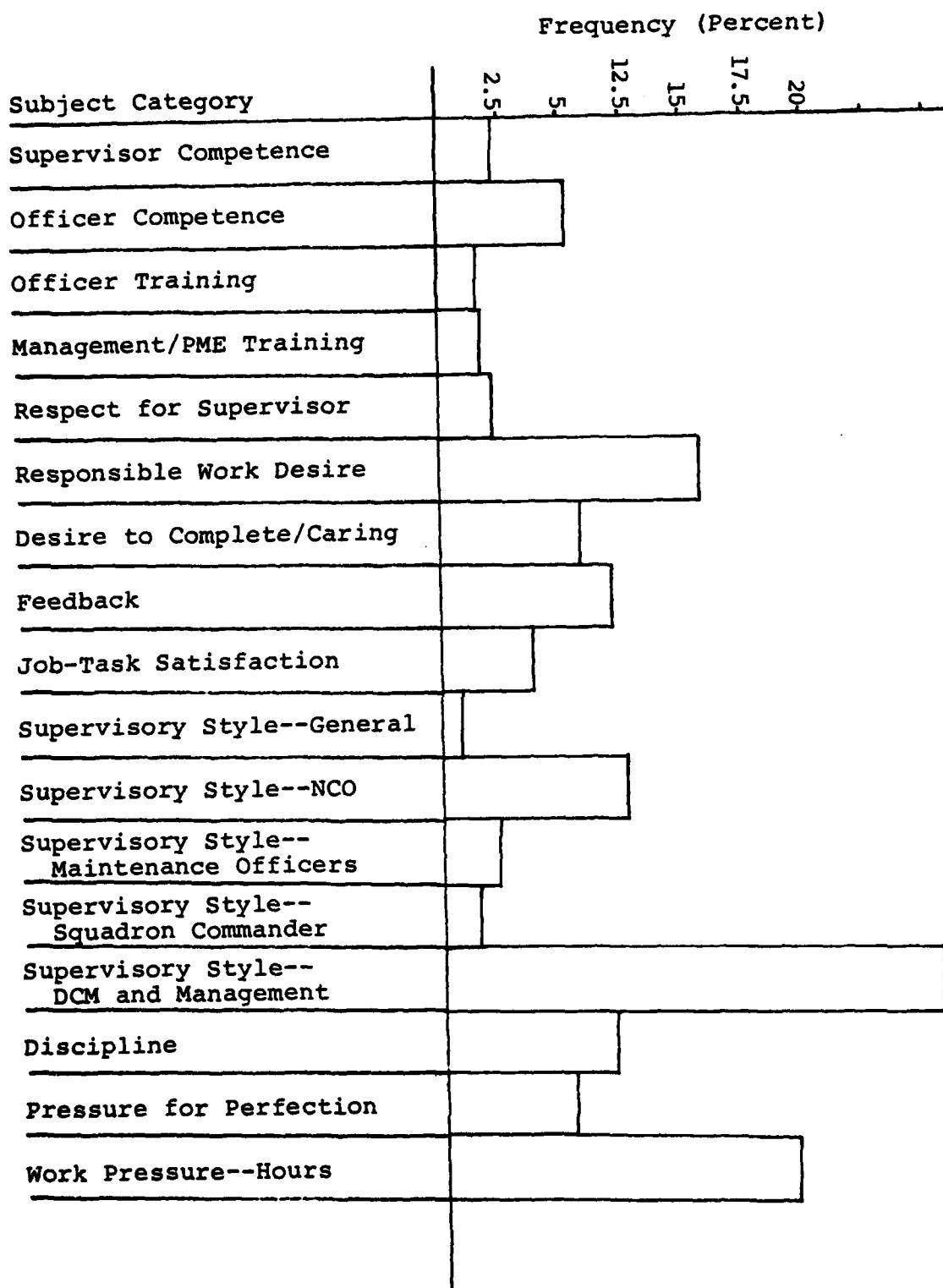


Fig. 4-1. Relative Frequencies, Base A

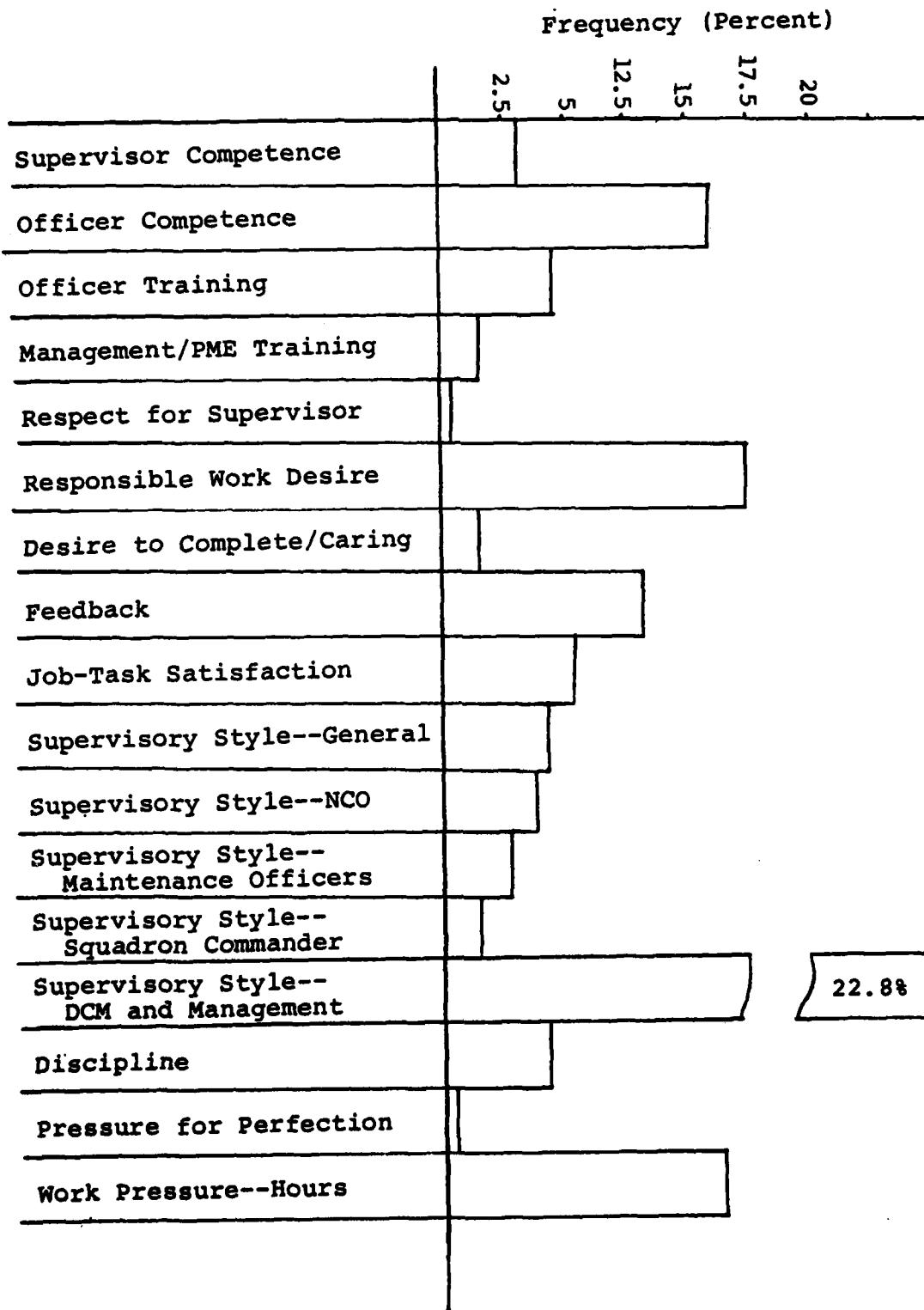


Fig. 4-2. Relative Frequencies, Base B

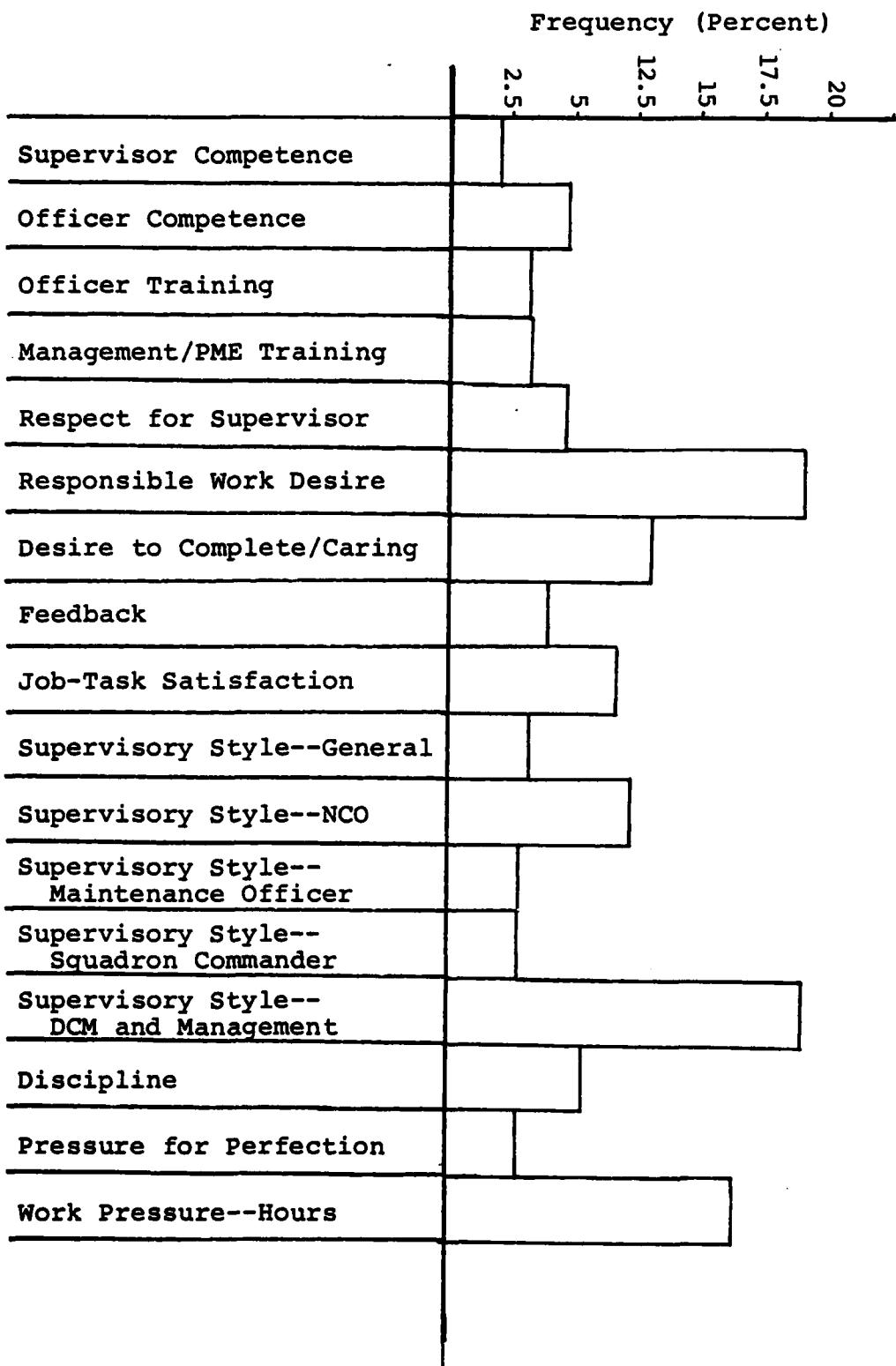


Fig. 4-3. Relative Frequencies, Base C

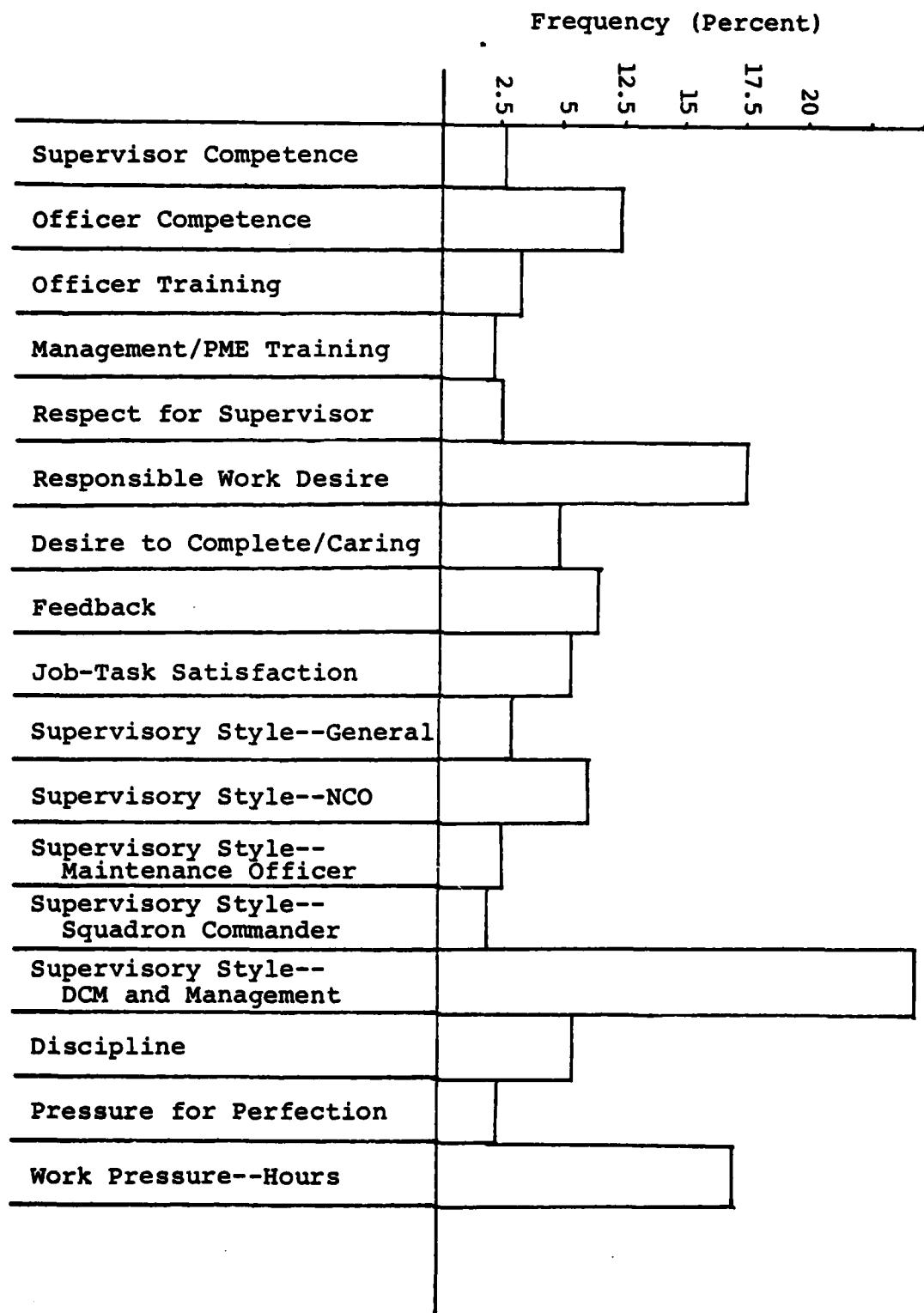


Fig. 4-4. Relative Frequencies, Overall

Tabulating the results and constructing the histograms shows the relative level of concern for problems in the different categories. Base A showed the most concern for the supervisory style of the DCM and higher management, followed by the work pressure created by long work shifts, desire to do meaningful work, and NCO supervisory style. Feedback and officer competence were also objects of concern. Base B also gave DCM and higher management's supervisory style the most concern, followed by the desire to do meaningful work and officer competence. Comments about the work shift and feedback were the next in line of concern. Base C considered DCM and higher management's supervisory style of equal importance to the desire to do meaningful, responsible work as the categories of highest concern. The length of work shifts, desire to do a complete job and caring about the work were the next highest levels of concern. NCO leadership style and feedback were also treated with concern, with officer competence and discipline considered lesser problems.

Over all of the bases together the results show that concern for the supervisory style of the DCM and higher management was considered the largest problem. Desire for meaningful, responsible work was next in importance with the length of work shift related to job pressure and officer competence in decreasing order of concern.

Feedback and NCO supervisory style were also considered problems, but those categories do not stand out as much as the others.

Test for Similarity

The Friedman F_r test tests whether or not the responses from the three bases are distributed similarly. At a level of significance of 0.10 and $(k - 1) = 2$ degrees of freedom, the rejection region for the null hypothesis is $F_r > 4.60517$. That is, if the test statistic is greater than $\chi^2_{.10}$ with $k - 1 = 2$ df, the hypothesis that the three bases are equal in their distribution of concern will be rejected in favor of the alternate hypothesis. In this case, the F_r value is 21.0735, which is greater than 4.60517, and as such the null hypothesis is rejected. The responses are not equally distributed with their concern for the different categories. Table 4-3 shows the tabular list used to calculate the R values. Calculation of the test statistic is as follows:

$$F_r = \frac{12}{bk(k+1)} \sum_{j=1}^k R_j - 3b(k+1)$$

$$F_r = \frac{12}{(17)(3)(3+1)} (41^2 + 32.5^2 + 33^2) - (3)(17)(3+1)$$

$$F_r = 21.0735$$

TABLE 4-3
OVERALL PERCENTAGE RESPONSE BY BASE

Category	Base A		Base B		Base C			
	Relative Freq.	Rank	Relative Freq.	Rank	Relative Freq.	Rank		
Supervisor Competence	.006	2.5	.013	1	.006	2.5		
Officer Competence	.015	2.5	.043	1	.015	2.5		
Officer Training	.004	3	.017	1	.011	2		
Management/PME Training	.004	3	.006	2	.011	1		
Respect for Supervisors	.006	3	.002	2	.015	1		
Responsible Work Desire	.030	3	.049	1	.045	2		
Desire to Complete/Care	.017	2	.006	3	.026	1		
Feedback	.019	2	.032	1	.013	3		
Job-Task Satisfaction	.011	3	.022	1.5	.022	1.5		
Supervisory Style								
General	.002	3	.017	1	.011	2		
NCO	.022	2	.015	3	.024	1		
Officers	.006	3	.011	1	.008	2		
Sq. Cmdr.	.004	3	.006	2	.008	1		
DCM	.058	2	.090	1	.045	3		
Discipline	.019	1	.017	2.5	.017	2.5		
Pressure for Perfection	.015	1	.002	3	.008	2		
Work Pressure-- Hours	.041	2	.045	1	.037	3		
		$R_A = 41$			$R_B = 32.5$			$R_C = 33$

Since:

$F_r > 4.60517$,

Reject H_0 ,

and at least two of the bases are distributed differently.

Descriptive Summaries

These descriptive summaries discuss the themes which emerged from each problem area. The summaries discuss these themes by base and together to help give an understanding of the similarities and differences between each base, and the pervasiveness of the problems commented on. The themes discussed comprise a major portion of the subject statements in each category.

Supervisor Competence

This category refers to NCO supervisors, separate from officer supervisors. Responses from Base A indicated that lack of experience in evaluators and supervisors was perceived to be a problem. Base B indicated almost unanimously that NCO supervisor competence is a problem, with five out of six responses citing lack of proficiency and experience. Base C was basically indeterminate on this subject; yet, over the three bases, lack of proficiency and experience was considered the main thrust of problems in this area.

Officer Competence

Base A considered inexperience to be the main thrust of problems in this area. Base B showed very strong indications that officer inexperience was the definite problem in this area, with all twenty statements indicating problems. Base C was also unanimous in this respect, with seven responses. At each base the respondents focused mostly on junior officers used as field supervisors. Some typical comments are:

The junior officer doesn't know enough to do more than get in the way. The NCO is frustrated and gives up. The AF just has too many people in the chain of command.

A lot of flight officers are worthless. They don't know their jobs yet. . . . They get technical training, but what they learn isn't of much benefit. They go through a TTB familiarization course, but it doesn't teach them enough. It puts them in a bad position because they are responsible but don't know enough.

A secondary theme in the officer competence area concerned qualified maintenance officers in senior positions. An example of the feeling in this area is this response:

You should never have a DCM who doesn't have maintenance experience. It's frustrating when he doesn't know what you do. . . . Ops guys go to maintenance and become commanders or DCMs.

Officer Training

The officer training category went along with the officer competence comments on the whole. Base A did not have any comments which pointed out a trend but both the

other bases emphasized that officers need more technical and management training. Overall, the emphasis was on the need to train officers more thoroughly in both technical and management areas. A typical response in this area follows.

The jobs Lts do in missiles could be done more efficiently by NCOs, who know the job. We need a better training program for officers in missiles. They should develop a program, taught by NCOs for Lts and Ops officers. It would help maintenance too.

Management/PME Training

This category centered on management and professional military education training given to NCOs. At all the bases, only positive comments were recorded concerning the training itself. The only negative comments or problems in this area concerned a desire to exercise the knowledge gained in the training, and these comments were too few to call a trend.

Respect for Supervisors/ Role Models

The comments in this area did not compose any single trend in a problem area but were of a general nature. Comments ranged from concern about officer competence to the amount of consideration or caring given to subordinates by their supervisors.

Desire To Do Responsible,
Meaningful Work

Each of the three bases considered not doing work that they considered meaningful and challenging a problem. Base A cited eleven out of fourteen cases, Base B cited nineteen out of twenty-three, and Base C cited ten out of twenty-one cases where pulling details, working below one's level of expertise, and non-task related work were considered problems. A typical comment states:

There is a problem in the way we get new people. . . . Sometimes we will get a bunch in and they will wait for 6 months to get into TTB. In that 6-month period, they are pretty much unproductive. They get details (cleaning, etc.) because they can't do anything else. We lose a lot of them (they lose interest) during this period.

Desire To Do a Complete Job/
Desire About Doing the Job

At the three bases individually, no trend developed in this category that could be called a major portion of the responses. However, the need to see an end product of the work was an often-mentioned desire, along with the lack of caring about the job as a result of waiting long periods of time to do meaningful work. No one quote can typify the range of statements in this area.

Feedback

Feedback is another area where the themes were fairly constant across the three bases. Base B responses indicated a subtheme which cited the excessive paperwork

and effort required to get commendations as a problem but, overall, the need for appreciation and recognition from supervisors and management was the most prevalent comment. The technicians at Base C had many positive comments about their DCM and his staff being visible and showing concern for people, but the other bases registered lack of a "pat on the back" as a recurring problem.

I would like to see the kids get more recognition. They are hungry for it. They don't get it from the 06s [Colonels]. I would like more letters of appreciation. If they screw up, they hear about it right away. I would like to see higher management in the dispatch area between 6 and 8 in the morning. It tells the team that someone cares for them.

The above comment sums up the situation. Other comments ranged from a desire to see an end product of their work, such as a launch, to the worthlessness of commendations due to management giving "turns" to the different shops and divisions in the organization.

Job-Task Satisfaction

The three bases were fairly close in their assessment of problems in the job satisfaction area, but varied some in degree. Base A cited lack of challenge and variety as a problem, with too much time spent on non-task-related areas contributing to dissatisfaction. Base B considered lack of control and authority to do a job as the major problem, with lack of challenge associated with waiting to do a meaningful task running second. Base C considered

working below one's level of expertise at non-challenging tasks and lack of variety as the major problems. Over the three bases, the main issue seemed to be that technicians and NCOs were working below their level of expertise at boring, make-work, non-challenging jobs. Much of this situation was attributed to "halls and walls" details pulled while waiting for training and to junior officers taking over some team chief responsibilities as field supervisors. Some typical comments on this subject follow.

They come here expecting to work on missiles, but they wait 6 to 8 months to get into TTB. By then they have an attitude problem.

and;

I can't use a lot of the knowledge and experience I've got. I find myself feeling bad because I just don't have any challenge. The most challenging thing here is getting the truck loaded on time.

Supervisory Style

This topic refers to five categories: general supervisory style, supervisory style comments about NCOs, maintenance officers, squadron commanders, and the DCM and higher management. The reason for putting the categories together is that the comments in all the categories concerned the same basic subjects, with the themes running parallel between categories at the individual bases.

The biggest problem at Base A was perceived to be micromanagement. Twenty statements concerned micromanagement and "over-the-shoulder management" by all levels of

supervision from the junior officer (field supervisor) to SAC headquarters. Lack of autonomy and authority to do a task bothered people from the technicians up to the DCM.

Some typical comments:

The "Buck Stop" program has never been deader than it is now. We're not allowed to make decisions at levels where they should be made.

There's been an increase in micromanagement and a decrease in morale. You work all day getting answers to why things went wrong yesterday. The senior manager shouldn't have to have most of that information. Not only do they not need it, they often forget that they asked you for it.

Base B also cited micromanagement as a serious problem, but cited lack of consideration and support from supervisors and management as being more serious:

Management doesn't seem to care about the morale of personnel, only about the number of dispatches. The problems don't go away, but they act like you have to push all the time.

Teams have little confidence in management. They get little support, and don't feel anyone cares. It destroys their motivation.

Another problem theme at Base B was crisis management. Not being able to stick to a schedule due to unscheduled maintenance causes last-minutes changes:

There's too much crisis management. They use stop-gap measures to deal with problems, instead of investigating the problem. They spend a lot of time passing paper when they need to find the real source of the problem.

At Base C, the main problem was overwhelmingly micromanagement. Complaints ranged from the technician to the DCM, and concerned problems with SAC headquarters down

to the NCO level. The comment most often seen was "give me a job and [let me] be allowed to do it" or something very similar. Many of the comments were directed at micro-management at the DCM and job control level. Too much high-level involvement in day-to-day business is cited as making people nervous about doing their jobs.

Over the three bases, the most prevalent problem noted was micromanagement at all levels of the organization, mostly originating from the top. For example:

Every morning we have a captain from SAC call, wanting to know the status of our missiles. Not only does he want to know that status, but also what kind of maintenance we are doing on it, what's the NORS [Not Operationally Ready for Supply] status, how many maintenance teams have been dispatched, when they were dispatched, and when we're going to send the next team. Then he checks to see if we dispatched it on time. If it wasn't, why not? He uses this info to brief a colonel, who then briefs a 2-star. . . . The 2-star probably needs to know what the alert rate is, but I doubt it he needs to know much more than that.

and;

There is too much direction from the DCM. He directs what we should do, when the squadron should handle the problem.

and;

Something that grates on most teams is micro-management. MMTS [missile maintenance teams] have officer flight chiefs. All it does is put them in the line of supervisors and, in effect, makes them MMT chiefs. The team chief no longer has the authority to go ahead with a repair but has to get approval from the officer, who usually doesn't know what's going on anyway.

One final theme in supervisory style which parallels the officer competence category is the need

for qualified maintenance officers both at the flight chief and DCM levels.

Discipline

An interesting trend emerged concerning discipline. Most of the comments at each of the three bases considered discipline too lenient, especially concerning job-related discipline. What complaints there were against harsh discipline were related mostly to vehicle infractions, alcohol-related incidents, and other off-the-job matters which seemed insignificant to the respondents. Although inconsistency was not always stated, it was implied by the range of complaints:

Discipline is inconsistent. They will make an example out of a good trooper who loses something, and let a total screwup who loses things all the time get by.

When I came in I was afraid not to do what I was told. Now, kids walk all over you.

I was caught with some government property. I was given an article 15, fined \$150 a month for 6 months, given a suspended bust to A1C, and put on the control roster. I'm a good worker, and a lot of people went to bat for me. Some of them said the colonel was too hard on me. If he had only given me a letter of reprimand I would probably have ignored it. I feel he did the right thing in being hard.

Work Pressure

Two categories were examined in this subject area, since they were often related to supervisory style. The categories chosen were: requirement for perfection and

length of work day/shift. At all three bases the comments centered around disgust for what they called "nitpicking, insignificant errors" and how the requirement for perfection in that area puts a lot of pressure on technicians and supervisors alike. The long work days, generally twelve to sixteen hours, added to the feelings of pressure from higher management and was generally seen as "chasing green-time" or on-alert time at the expense of morale and job satisfaction.

CHAPTER V

SUMMARY AND CONCLUSIONS

Introduction

Chapter I outlined the research objectives of this study. They were:

1. To identify problems in supervision in the SAC ICBM maintenance environment;
2. To gain a greater understanding of problems and of the environment of missile maintenance;
3. To compare these bases concerning their perceptions of problem areas to determine which problems are local and which might be considered force-wide; and
4. To provide a base from which further studies of the problems cited can be carried out or from which policy changes can be initiated.

This chapter discusses the results of this study in terms of the research objectives and provides recommended areas of further study and changes in policy.

Summary of the Results

The results in the last chapter show several things. The frequency distributions of the responses from the three bases show which areas are perceived to be sore points in the area of supervision at each of the three bases. The

overall distribution of responses points out problem areas which are more common to all the bases. Those common areas can be targets for studies or policy changes at the base level and higher, such as Numbered Air Force and SAC. Those areas which are peculiar to one of the bases, or which are less pervasive over the three bases, can be considered targets for concern at the base or organizational level. Areas of concern which were considered overall problems are: supervisory style of the DCM and of higher management within and without the organization; desire to do meaningful, responsible work; the length of the work shift as a source of work pressure; and officer competence. In addition, the frequency distributions show a priority listing of which areas were most important. The problem areas given above are in order of perceived concern. Each base had a different order of concern for problems, yet the principal problem areas seemed to run fairly parallel.

The test for homogeneous distribution showed that the three bases were distributed dissimilarly in their responses concerning the problem categories. This test does not attempt to show more than the fact that there exist significant differences in some areas of concern about supervision between bases. In other words, each base has its own individual problems in addition to problems which are pervasive across the entire sample. For example, Base B considered officer competence a much more

pressing problem than did the other bases, while Base A treated NCO supervisory style with more concern than did the other bases. The Friedman F_r test shows only that there are enough localized problems associated with each base to call them different.

The descriptive summaries were the main thrust of the study. While the frequency distributions pointed out the areas of most concern for each base and the entire sample, the descriptive summaries attempt to identify the specific problem trend within those areas of concern. This type of analysis helps to understand the specific environment and to get a feeling of what the organizational atmosphere is. It also shows where exactly the biggest problems lie in order to conduct further study or to initiate policy changes. For example, the largest overall problem area was the supervisory style of the DCM and higher level management. Within that problem area, micro-management by all levels of supervision was considered to be the worst problem. The next overall area of emphasis was the desire to do meaningful, responsible work. Within that area, pulling make-work details, waiting for training, and doing work that required a level of expertise below that of the individual doing the work were the trends that characterized that category the most. The length of work shift related to work pressure was the next most frequent category response, yet in this case the trend was only that

the long hours were undesirable and affected family and personal lives as a result of task oriented rather than people oriented management. Officer competence responses were directed at all levels, with junior officers getting the most complaints.

Each base can be treated the same way by using the descriptive summaries. Base A considered DCM and higher management supervisory style the problem area of concern, followed by desire to do meaningful work, length of work-shift, and officer competence as the main supervision problems. Micromanagement, not doing meaningful and challenging work, and long hours were the respective trends in the above categories. Base B considered the same category with most concern as Base A did with the same principal trend, but other trends such as crisis management and lack of qualified maintenance officers were also present. Desire to do meaningful work was next, followed by officer competence. Base C was similar to Base A in its assessment of problems.

How these problems with supervision affect job satisfaction and motivation is important, considering that satisfaction and motivation are important phenomena in missile maintenance production. Micromanagement affects motivation in that autonomy and authority to do a job is eroded at the operative level of the organization. As a result, the authority of an individual to do what it takes

to complete a task is not commensurate with the responsibility placed on him or her for task completion. Lack of meaningful, responsible work affects motivation through lack of objective challenge, perceived meaningfulness, and responsibility feelings for doing an important task. Excessive hours and heavy work pressure lower job satisfaction through disruption of personal lives, anxiety on the job, and perceived lack of consideration by management and supervisors. Lack of officer or supervisory competence erodes job satisfaction through the loss of confidence in the ability of those supervisors to manage and support the efforts of subordinates. As a result of these problems, motivation and job satisfaction in an organization could be affected to the point where the maintenance effort itself could be impeded.

Conclusions

The study attained the research objectives. The frequency analysis identified the principal problem areas of concern for each of the three bases and for the overall sample. The descriptive summaries identified specific problems within each category identified by the frequency analysis. Thus the frequency analysis together with the descriptive summaries identified problems with supervision in the SAC ICBM maintenance field, which was the first research objective.

The second research objective was to gain a greater understanding of the SAC ICBM maintenance environment with regards toward supervision. This objective was attained through the descriptive summaries, which identified the most prevalent trends in each of the problem areas chosen for analysis. Through analysis of each individual statement and the background study of the missile maintenance organization, greater understanding of the missile maintenance supervisor's environment was attained.

The third objective, comparison by base, served to help see how pervasive certain problems were across the missile maintenance field. The sample taken was 50 percent of the six Minuteman missile bases, a significant amount of the total population. The frequency distribution analysis of problem categories pointed out the problems held in common concern by the sampled bases. The Friedman F_r test showed that even though the more significant problem areas were common across the entire sample there were enough individual differences in other categories to say that each base was distributed differently in its concern about individual problems. This does not necessarily weaken the argument for the overall concern about the principal problem areas, since they seemed to agree so strongly from base to base, but rather it shows that each base has its own local problems. A more quantitative study in this area would be appropriate to find the exact degree of difference

between the bases, but that was not necessary for the purpose of this study.

The last objective, to provide a base for future study and policy changes concerning supervision in the SAC ICBM maintenance field, was accomplished through the identification and, albeit simple, prioritization of problem areas in the frequency analysis and by the more specific identification of problems in the descriptive summary analysis. Some problems were present in enough degree to justify immediate changes in policy, even if it were only a change in supervisory style by a branch chief or flight supervisor. Other problems might require more research, such as a study to find better scheduling methods to eliminate crisis management, schedule deviations, and overly long work shift hours at a base level.

The objectives in this study were qualitatively oriented and the methodology used was deemed appropriate. However, the data used in the research consisted of a snapshot in time when the problems indicated were prevalent. Changes in personnel and supervisors and supervisory styles may have improved or exacerbated situations at any of the three bases sampled. Changes in policy may also have taken place. The value of this study as a picture of what is happening right now may be limited. However, if the study is correct in its finding that micromanagement by all levels of supervision from the

organization to HQ SAC is the most serious problem, then perhaps the policy changes have not been quick in coming and the study still has value as an indicator of the missile maintenance environment.

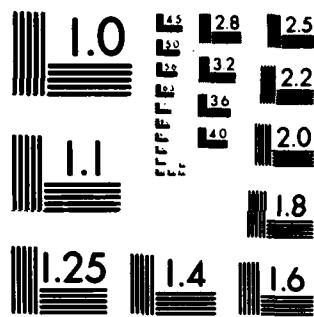
Recommendations

Notwithstanding the above caveat, several recommendations are appropriate. A study to determine the degree to which micromanagement and other faults in supervisory style inhibit the performance production is needed. Steps to train officers in management and technical backgrounds could help alleviate the problems of micromanagement, crisis management, long hours and unnecessary work pressure, and officer competence and credibility. Steps to inject challenge and meaningfulness into the work could significantly improve satisfaction and motivation. Not a meager recommendation is one that advocates that each new maintenance officer become familiar with his new environment as regards supervision and take active steps to become technically knowledgeable, proficient in management, and active in supervision.

AD-A135 599 A QUALITATIVE ANALYSIS OF SUPERVISION IN SAC MINUTEMAN
ICBM MAINTENANCE(U) AIR FORCE INST OF TECH
WRIGHT-PATTERSON AFB OH SCHOOL OF SYSTEMS AND LOGISTICS
UNCLASSIFIED S W FANCHER SEP 83 AFIT-LSSR-112-83 F/G 5/9 NL

2/2

END
DATA
FILED
1 84
DTIC



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963 A

BIBLIOGRAPHY

REFERENCES CITED

1. Albanese, Robert. Managing Toward Accountability for Performance. 3d ed. Homewood IL: Richard D. Irwin, Inc., 1981.
2. Applewhite, P. B. Organizational Behavior. Englewood Cliffs NJ: Prentice-Hall, 1965.
3. Arnold, Hugh J. and Daniel C. Feldman. "A Multivariate Analysis of the Determinants of Job Turnover," Journal of Applied Psychology, Vol. 67, No. 3 (1982), pp. 350-360.
4. Barrett, R. S. "Explorations in Job Satisfaction and Performance Rating," Personnel Administration, September-December 1964, pp. 14-17.
5. Benson, P. George and James T. McClave. Statistics for Business and Economics. 2d ed. San Francisco: Dellen Publishing Co., 1982.
6. Brayfield, A. H. and W. H. Crockett. "Employee Attitudes and Employee Performance," Psychological Bulletin, Vol. 52 (1955), pp. 396-424.
7. Butler, W. P. "Job Satisfaction Among Foremen--Case Study No. 2," Personnel Practice Bulletin, March 1961, pp. 5-14.
8. Byars, Lloyd L. and Leslie W. Rue. Supervision: Key Link to Productivity. Homewood IL: Richard D. Irwin, Inc., 1982.
9. Carroll, B. Job Satisfaction--A Review of the Literature. Ithaca NY: Cornell University, 1969.
10. Chenzoff, A. P. and R. P. Joyce. "Maintenance Environment Improvement Analysis: Phase II Pretest." Air Force Human Resources Laboratory Report No. AFHRL-TP-81-32, Air Force Systems Command, Brooks AFB TX, January 1982.

11. Chenzoff, Andrew P., and others. "Analysis to Improve the Maintenance Environment: A View from Active Duty Aircraft Maintenance Personnel." Unpublished Research Report, second draft, unnumbered, Applied Sciences Associates, Inc., Vanencia PA, December 1982.
12. Goodfellow, Matthew. "Supervisors: Key to Quality Control," Telephone Engineer and Management, May 15, 1981, pp. 71-74.
13. Graen, G. and R. C. Liden. "Generalizability of the Vertical Dyad Linkage Model of Leadership," Academy of Management Journal, September 1980, pp. 451-465.
14. Graen, G., M. A. Novak, and P. Sommerkamp. "The Effects of Leader-Member Exchange and Job Design on Productivity and Satisfaction: Testing a Dual Attachment Model," Organizational Behavior and Human Performance, August 1982, pp. 109-131.
15. Griffin, R. W. "Relationships Among Individual Task Design, and Leader Behavior Variables," Academy of Management Journal, December 1980, pp. 665-683.
16. Gross, A. C., and C. F. Paul. "Increasing Productivity and Morale in a Municipality: Effects of Organizational Development," Journal of Applied Behavioral Science, January-March 1981, pp. 59-78.
17. Hackman, Richard and Greg R. Oldham. Work Redesign. Reading MA: Addison-Wesley Publishing Co., 1980.
18. Hall, Douglas T. Careers in Organizations. Glenview IL: Scott, Foresman, and Co., 1976.
19. Herzberg, F., B. Mausner, and B. B. Snyderman. The Motivation to Work. New York: John Wiley and Sons, Inc., 1959.
20. Hom, Peter W. and Charles L. Hulin. "A Competitive Test of the Prediction of Reenlistment by Several Models," Journal of Applied Psychology, Vol. 66, No. 1 (1981), pp. 23-39.
21. Jackson, Major Michael, USAF, and Major John Ward, USAF. "Guidebook for Missile Maintenance Managers." Unpublished Research Report, unnumbered, Air Command and Staff College, Maxwell AFB AL, April 1979.

22. Katzell, R. A. "Work Attitudes, Motivation, and Performance," Professional Psychology, June 1980, pp. 409-420.
23. Klimoski, R. J. and N. J. Hayes. "Leader Behavior and Subordinate Motivation," Personnel Psychology, Fall 1980, pp. 543-555.
24. Lee, H. C. "Do Workers Really Want Flexibility on the Job?" Personnel, March/April 1965, pp. 74-77.
25. Locke, E. A. "Toward a Theory of Task Motivation and Incentives," Organizational Behavior and Human Performance, Vol. 3 (1968), pp. 157-189.
26. Muchinsky, Paul M. and Mark L. Tuttle. "Employee Turnover: An Empirical and Methodological Assessment," Journal of Vocational Behavior, Vol. 14 (1979), pp. 43-77.
27. Patton, M. Qualitative Evaluation Methods. London: Sage Publications, Inc., 1980.
28. Pitkin, Chief Master Sergeant Danny G. Missile Enlisted Financial Manager, HQ SAC/LGBA, Offutt AFB NE. Telephone interview. 23 July 1983.
29. Porter, L. W. "A Study of Perceived Need Satisfactions in Bottom and Middle Management Jobs," Journal of Applied Psychology, January 1961, pp. 1-10.
30. Sellitz, C., M. Jaboda, M. Deutsch, and S. Cook. Research Methods in Social Relations. New York: Holt, Rinehart, Winston, 1959.
31. Strategic Air Command. Intercontinental Ballistic Missile Maintenance. SACR 66-12. Offutt AFB NE, September 1, 1977.
32. Tarantino, Technical Sergeant, USAF. HQ Air Force Logistics Command/MPCAH, Wright-Patterson AFB OH. Letter, subject: Career Job Reservation Waiting List, to 2750th Air Base Wing/DPMH, Wright-Patterson AFB OH, 4 May 1983.
33. U.S. Department of the Air Force. Equipment Maintenance Policies, Objectives, and Responsibilities. AFR 66-14. Washington: Government Printing Office, November 15, 1978.

34. _____ . Maintenance Management. AFM 66-1. Washington: Government Printing Office, July 1, 1978.
35. Vroom, V. H. Work and Motivation. New York: John Wiley and Sons, Inc., 1964.
36. Wernimont, P. F. "Intrinsic and Extrinsic Factors in Job Satisfaction," Journal of Applied Psychology, February 1966, pp. 41-50.